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ON CERTAIN FEATURES IN THE PROGNOSIS OF PNEUMONIA.

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THE higher the mortality the more difficult is it to estimate in any disease the value of the various elements of prognosis. Pneumonia is certainly the most fatal of the acute infections of adults in temperate climates. No other disease kills from one-fourth to one-third of all persons attacked. Very elaborate statistics have been collected showing the death-rate of the disease. These have been grouped together by Wells,[1] of Chicago, in one of his excellent papers on pneumonia. Of 233,730 cases the mortality was 18.1 per cent.

Unfortunately it is chiefly from hospitals that we have to gather our facts. S. H. Dickson, whose essay on "Pneumonia" is a storehouse of valuable information, comments on "the remarkable equality of this proportional mortality in peace and all comfort, in hospitals of wealthy communities, in the field of destructive war, and in hospitals and barracks the emphatic seats of destitution, privation, exposure, and neglect."

A few years ago I collected the statistics of mortality from some of the leading hospitals of this country. In the Montreal General Hospital the death-rate was 20.4 per cent.; at the Charité Hospital, New Orleans, 38 per cent.; at the Pennsylvania Hospital, Philadelphia, 29.1 per cent.; at the Boston City Hospital, 29.1 per cent.; at the Massachusetts General Hospital, 25 per cent. These figures are very much the same as those in the large English hospitals, given recently

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[1] Journal of the American Medical Association, 1892.

by Dr. Leech.[1] Thus at St. Thomas's for eleven years the mortality was 20 per cent.; at St. Bartholomew's Hospital for fifteen years the mortality was 18.6 per cent.; at the Edinburgh Royal Infirmary, 27.1 per cent.; at the Manchester Royal Infirmary, 28.8 per cent.

Of the first 124 cases of croupous pneumonia admitted to or developing in the Johns Hopkins Hospital, 37 died, a mortality of 29.8 per cent.

The mortality in private practice, though high, does not reach the figures which I have just given. The only large statistics available on this point are those in the "Report of the Collective Investigation Committee of the British Medical Association," which was drawn chiefly from private practice. The mortality was only 12 per cent. I wish there could be a collective investigation on this point from the practices of eight or ten of the leading family physicians in New York, Philadelphia, Boston, and Baltimore. I feel sure that the figures in adults would show a very high death-rate. It would scarcely be fair to ask consultants to speak of their figures, as they see only the more severe forms. I should say the mortality among the cases which I see with physicians is at least 50 per cent.

Among the circumstances influencing the prognosis some are general, as age, race, and habits; others special, as the degree of involvement of the lung, the fever, complications, etc.

Age is a very important factor. As Sturges remarks, the old are likely to die, the young to recover. Series of cases are quoted in Wells's paper in which the mortality in children has ranged from 1.9 to only 3.3 per cent. On the other hand, above sixty years of age the death-rate is very high, reaching 50 to 60, or even 80 per cent. So fatal is it that to die of pneumonia in this country is said to be the natural end of elderly people.

The disease appears to be much more fatal in the negro than in the white. The very high rate of mortality from the disease in the South is stated to be due to this cause, but of the first 124 cases at the Johns Hopkins Hospital 23 were in colored patients, with 6 deaths, a mortality of 26 per cent., against 101 whites, with 31 deaths, a mortality of 30.6 per cent.

Previous habits of life and the condition of bodily health at the time of the attack form the most important factors in the prognosis of pneumonia. In analyzing a series of fatal cases one is very much impressed with the number of cases in which the organs show signs of degeneration. In 25 of my 100 autopsies at the Montreal General Hospital the kidneys showed extensive interstitial changes. Individuals debilitated from sickness or poor food, hard drinkers, and that large class of hospital patients, composed of robust-looking laborers

between the ages of forty-five and sixty, whose organs show signs of wear and tear, and who have by excesses in alcohol weakened the reserve power, fall an easy prey to the disease. Very few fatal cases occur in robust, healthy adults. Some of the statistics given by army surgeons show better than any others the low mortality from pneumonia in healthy picked men. The death-rate in the German army in over 40,000 cases was only 3.6 per cent.

Apart from certain complications the fatal event in pneumonia may result from a gradual toxæmia, or from mechanical interference with the respiration and circulation.

The toxæmia is the important element in the disorder, to which in the majority of cases the degree of pyrexia and the consolidation are entirely subsidiary. The poisonous features may develop early and cause from the outset severe cerebral symptoms, and they are not necessarily proportionate to the degree of lung involved. There may be severe and fatal toxæmia with consolidation of only one-half a lobe, while a patient with complete solidification of one lobe or of a whole lung may from beginning to close of the attack have no delirium. Many of the cases which show the most profound toxæmia present variations from the typical picture; thus there may be no cough, no expectoration, very slight fever, and no leucocytosis. In the following cases the clinical features were rather those of a profound intoxication than of any local disorder:

Pneumonia beginning with very acute delirium simulating insanity. November 7th, 8.15 p.m., I was sent for to see E. H., aged twenty-eight years, a large, able-bodied man, who had been brought by his family from Pittsburg, Pa., where he had been in the West Penn Hospital for eight days. He had been in Chicago at the World's Fair and had seemed quite well. He left Chicago on Monday evening, October 30th. On the train he was noticed to be behaving strangely, and had delusions that there were numerous train-robbers, and that there were a number of persons following him. His conduct disturbed the passengers so much that at Pittsburg he was taken in a patrol-wagon to the West Penn Hospital. There he became actively delirious and was placed in a strait-jacket, after having made a futile attempt to cut his throat. He was evidently very ill, though he had no cough, and there was not much fever, though he complained a good deal of pain in the side. His relatives removed him yesterday. He stood the journey well. When I saw him he seemed rational; respirations were very hurried, 55 to the minute. The color was bad; the pulse was 120, and feeble. He had just been carried up and was in a condition of a good deal of excitement. He told a very pitiful story of his capture, as he called it, at Pittsburg, and how the people had conspired to put him in the hospital. The temperature was 99.5°. It really seemed as if the condition was some form of acute insanity, which opinion was strengthened, of course, by the fact that on a former occasion he had had some slight mental aberration. He begged me not to examine the chest, as he was quite exhausted.

8th. The patient had a fairly good night; morning temperature was 100.2°, pulse 128; the finger-tips a little cyanosed. Examination of the chest revealed to my surprise almost complete consolidation of the left lung, with dry, intense tubular breathing. The only resonance was in the infraclavicular region, where the note was Skodaic in character. He was very much quieter, the delirium had entirely disappeared, and he took his medicine and food well. He complained of a great deal of pain, and he had a quarter of a grain of morphine at night. He was given whiskey and Dover's powder.

9th. The patient seemed to be doing fairly well. There was no delirium. The temperature in the morning was a little over 100°, and in the evening 101.2°, the first time that it had registered above 101°. The lung was completely consolidated to the top; intense blowing breathing everywhere. He had no cough, and no expectoration. The pulse was a little more rapid in the evening, 130; respirations at 60. The tongue was not dry, and in the evening he expressed himself as feeling more comfortable.

10th. This morning, at 8.15, the temperature was 99.5°; the pulse 118, and of rather better volume. He had dozed at intervals through the night, but not having as much sleep as he wished, and he still complained of a good deal of pain. He seemed, however, quite rational. He had taken his food very well. There was no cough. The color of the lips was good; that of the finger-nails a little livid. Respirations 60 per minute. He had not taken the ammonia during the night, and he was ordered full doses of strychnine. His condition, on the whole, though still critical, seemed more comfortable, and he said that the pain was much less. About eleven o'clock he became a little more delirious, the nurse was called, and he was found perspiring profusely, and had become very cyanosed. The respirations became more rapid, he became unconscious, and within a little more than an hour from the onset of the serious symptoms death took place.

Toxic pneumonia, without cough, expectoration, or high fever. Mr. G., aged about sixty-six years, seen February 8, 1894, with Dr. Alan P. Smith. The patient was a very vigorous, healthy man, who, during the winter, had been somewhat overworked. On the evening of February 3d he attended a concert at the Peabody Institute, which was rather long, and he complained a good deal of being tired. On Sunday, February 4th, he did not take his breakfast as usual, and toward the middle of the day he had a chill, not, however, of long duration or of great severity. He complained of a good deal of pain in the back and aching in the joints and in the legs, so that it was regarded as possibly a case of influenza. He had no cough, no shortness of breath, and the fever was very moderate. He had pain across the lower part of the back, which was exaggerated on deep inspiration.

On Tuesday and Wednesday he was weak and prostrated, complaining a good deal of the muscular pains. The temperature was not above 100.5°; the pulse was good; there was neither cough nor expectoration. The lungs were examined, but no changes were found. He seemed, however, very ill, and he had occasionally a little wandering.

On the morning of Thursday, the 8th, Dr. Smith discovered dulness at the base of the right lung. Throughout the day he became much worse, more delirious, and the pulse feebler. When I saw him late in the afternoon the pulse was 132, the beats irregular in volume and intermittent. The heart-sounds were clear, but had a somewhat fœtal

rhythm. The skin was moist and he was sweating profusely. The tongue was dry. He had been wandering a good deal, but he talked to me rationally. The lungs were clear in front; behind over the middle of the scapula there was flatness which extended as far as the posterior axillary fold, with tubular breathing and numerous râles. There were no râles at the base of the other lung, and the respirations were only 28. There was not, nor had there been, any respiratory distress.

The abdomen was not distended, the spleen not enlarged. There had been from the start neither cough, nor expectoration, nor had there been any special dyspnœa. The patient had had an objection to stimulants, but he was ordered at once whiskey and brandy in full doses, ammonia, and for twenty-four hours moderate doses of digitalis.

Throughout the night his condition improved materially and on the morning of the 9th the pulse was 98, regular, full, and of fair tension.

He had had some delirium, but seemed altogether better, and he had taken his nourishment and stimulants well. The temperature was 100.5°. In the evening he did not seem quite so well; the temperature rose to 101.8°, the highest point it had reached; the pulse was more rapid; he had had more delirium; the tongue was dry; and he looked badly; still no cough, no expectoration. The consolidation had extended a little further into the axilla.

10th. Patient had a bad night, and had refused to take his food. The pulse had again become very rapid and irregular, and he seemed much more prostrated. Dr. Smith stayed the night with him, as he would only take the medicines from him. The pulse this morning is better, 116, of good volume, but occasionally drops a beat. He is rather drowsy, the respirations are 32, tongue dry, and he looks like a man in a condition of profound toxæmia. He sank gradually and died in the evening.

These two cases illustrate a type of pneumonia in which the general toxic symptoms overshadow entirely the local and more usual features of the disorder. These severer types are seen particularly in the epidemic form and in old people, and the toxæmia may be out of all proportion to the local disease.

Probably, too, the sudden and unexpected death in pneumonia may be attributed to the action of the specific toxins on the heart-centres, rather than on the muscular substance of the organ itself. This seems more reasonable than the former idea that it was the action of the high fever upon the myocardium. These cases are by no means uncommon, and one has always to be on the lookout. I have notes of three cases which I have seen within the past few years. In the first, massive pneumonia with great obscuration of the physical signs, owing to blocking of the bronchial tubes, death occurred quite unexpectedly on the sixth day; in the second, death occurred suddenly on the fourth day; and in the third case the patient died in collapse on the third day.

Massive pneumonia; death on the sixth day. Benjamin M., aged thirty-eight years, colored, hod-carrier, was admitted December 14, 1894, complaining of pain in the right side of the chest and cough.

He had been strong and well, with the exception of rheumatism at twenty-five years; he had a chancre in 1884.

On December 5th he caught cold, but kept at work for the two following days; on Monday, the 10th, he had a headache, and while still in bed was seized with severe pain in the right chest, followed almost immediately by a severe chill. The pain, which was sharp and stabbing, grew steadily worse and was aggravated by coughing. The expectoration was profuse. He had been in bed since the onset of the pain.

On admission the temperature was 104°, the pulse 130, the respirations 40. He was a large, powerfully built man, propped up in bed on his back; respirations shallow; no marked cyanosis. The mind was clear. Pulse was full, bounding, and slightly dicrotic; the tension was low. The expiration was interrupted by a slight jerking cough. The percussion-sound on the right side of the chest in front was clear to the fourth rib; below this and over the left back it was dull. There was a distinct friction-rub heard in the right axilla and at the base. The breathing was nowhere typically tubular, but in the infrascapular space behind there was modified bronchial breathing. After coughing a few moist râles were heard. Tactile fremitus was present; the voice-sounds were nasal. The other lung was clear. The leucocytes were 10,200 per c.cm. The sputum was viscid, slightly rusty.

15th. The temperature kept uniformly between 103° and 104°; he was delirious; the pulse was about 120, respirations 48 to 50. The cough was very frequent and distressing. There was a tympanitic note at the right apex, shading into dulness, which extended over the whole of the rest of the lung. The friction-rub was loud in the axilla, where the respiration was distinctly tubular. At the base the breathing was feeble, and distinct tubular breath-sounds could be heard, except at one small spot just below the angle of the scapula. On the left side the breath-sounds were clear, with the exception of a few fine râles at the end of inspiration. The patient seemed to be doing very well. The leucocytes sank on the 15th to 6000 per c.cm. There was albumin in the urine in considerable amount, and a large number of granular casts.

On the morning of the 16th, at 8 o'clock, there were urgent dyspnœa, great rapidity of the heart's action, and liquid râles everywhere over the left lung and in front upper lobe of the right lung. He sank and died in a few hours.

Abstract of Autopsy (No. 602). Anatomical diagnosis: massive pneumonia affecting right lung; occlusion of bronchus (by fibrinous plug) going to the lower lobe; acute serofibrinous pleurisy; fresh patch of pneumonia in left lung; general pneumococcus-infection.

The right lung, with the exception of the anterior edge, extending backward a quarter of extent of the entire lung and the apex, was consolidated. The solidified portions were granular, reddish; the apex much œdematous. The main bronchus going to the lower lobe of the lung was filled with a fibrinous plug which completely obliterated the lumen. The pleura was covered with a fibrinous exudate.

In the left lung there was a small area of consolidation in the lower lobe. There was no endocarditis. The heart-flesh was friable. The kidneys looked a little swollen and the cortices were coarse. Cultures from the organs and from the blood of the heart showed colonies of the micrococcus lanceolatus.

In the following case death occurred suddenly on the fourth day:

Lobar pneumonia; sudden death on fourth day. A. P., aged twenty-two years, colored, driver, admitted May 21, 1894, complaining of cough.

The family and personal history was very good.

Three weeks ago he was struck on the back of the ear with a glass bottle. The wound bled profusely. A week later he had fever and headache, and was cupped on the back of the neck.

He was seen at the dispensary two days ago, at which time he had no fever, and the examination was negative.

Yesterday, the 20th, about 6 P.M., he had a shaking chill, followed by fever and a sharp pain in the left side. The pain was very severe through the night, and was much worse when he drew a deep breath. He had a cough with blood-tinged expectoration.

The temperature on admission was 103° and rose at 2 P.M. to 104°; the respirations were 56 and shallow; the pulse 128, soft, full, and regular.

The examination showed dulness in the lower lobe of the left lung, with distant but not distinctly tubular breathing. The heart-sounds were clear. The sputum was rusty and contained numerous diplococci. There were albumin in the urine and a few granular and hyaline casts. The leucocytes on the 21st were 50,000. He was ordered ice poultices and Dover's powder at night.

22d. The temperature had been remarkably uniform, scarcely varying half a degree from 104°. The signs of consolidation in the lower lobe of the left lung were more marked. The heart-sounds were clear; the first a little reduplicated, and the second pulmonic was accentuated. There was a soft, systolic murmur in the pulmonary area. The spleen was not palpable. The urine was a little smoky, and a few blood-cells were seen, but no tube-casts. The sputum was mucopurulent. The leucocytes were 20,000 per c.cm.

On the 23d the temperature had risen nearly to 105°; the pulse was 116, regular. At the time of the morning visit he seemed doing very well. On the evening before, he had an attack of hiccough and had been very restless. The mind was clear, and there did not appear to be any extension of the local condition. I noted, however, that Skoda's resonance was very marked at the apex in front. He had been taking small quantities of whiskey and aromatic spirits of ammonia. In the evening, without any warning, or without any special aggravation of his symptoms, the nurse noticed that he was gasping for breath, and in a few moments he died before the house-physician could be summoned.

Abstract of Autopsy (No. 521). Anatomical diagnosis: croupous pneumonia; acute nephritis; fatty degeneration of heart-muscle.

The left lung was voluminous; the pleura of the lower lobe was covered with fibrin. The lower lobe was consolidated throughout, finely granular, and on section grayish-red in color. The upper lobe was also consolidated, particularly in the anterior half.

The right lung was voluminous; the upper and lower lobes emphysematous. The lower lobe is slightly granular, on section red, and in a condition of beginning hepatization. The heart-muscle showed microscopically much fat. The kidneys were swollen, mottled on the surface, and microscopically showed signs of acute nephritis.

Quite serious collapse-symptoms may occur early in the disease, even within twenty-four hours. The following is one of the most striking

cases I have seen, in which the patient had three attacks of cardiac syncope, the last of which proved fatal on the third day of the disease. I give the notes just as I dictated them to my secretary on returning from the consultation :

Pneumonia; fatal collapse on the third day. June 27, 1893, 12.45 A.M., I saw, with Dr. King, Mrs. S., aged forty-four years, a healthy, well-nourished woman, who had a severe chill on Saturday night, 24th, and who since has had signs of pneumonia at the right base, with high fever, reaching at times to 106°. There has been no albumin in the urine, the respirations have not been above 48, she has had very little cough, and her general symptoms have not been alarming ; but on three occasions she has had serious collapse-symptoms, the first on Sunday night, which lasted for only a short time, the second early this morning, at about 3.30, and the other about an hour ago. I found her in the following condition :

She lay on her back with the eyes open and fixed ; the pupils small, and did not react well to light. The color of the face was fairly good ; the lips red, not cyanotic. She did not reply to questions and seemed completely oblivious to her surroundings. The respirations were hurried, 40 to the minute. The appearance was rather that of a nervous or hysterical attack than of severe collapse. At first she did not look very ill, except that the sockets of the eyes were rather dark and a little sunken. The face, however, was not at all pinched. The pulse was 132, small, and easily compressible ; when first felt it was quite regular. She had just been given a hypodermic injection of a drachm of brandy, and she was ordered hypodermics at once of ether and strychnine. I remained about half an hour, during which time she changed remarkably. The unconsciousness persisted ; she moved the mouth somewhat, and it twitched a little. The limbs were motionless. The heart-sounds at first were perfectly clear and distinct, without murmur. Gradually they became feebler ; the pulse rose to 140, was small, and beats were occasionally dropped. The color of the hands was at first good, the nails alone perhaps a little cyanosed. Gradually there was a suffusion of the fingers and then of the hands, and within less than half an hour after I saw her the pulse could not be felt at the wrist, and the heart-sounds were extremely feeble—only just audible. The respirations did not materially increase, but they became a little noisy, and her face changed somewhat in expression. It really looked as if the end was imminent.

P. S.—It was ; she died at 2.30 P.M.

Mechanical interference with respiration or circulation is a very much less frequent cause of death. The interference may be the gradual exclusion of the air, by the filling up of the follicles, or the capillaries in extensive territories may be compressed. These factors occur together, and the depressing element of great loss of blood-serum, upon which Bollinger lays stress, must also be taken into account.

Very large areas of the breathing-surface may be cut off without seriously disturbing the cardio-respiratory mechanism. In no way is this more strikingly shown than by the condition of the patient after

the crisis. On one day with a lung consolidated from apex to base, the respirations at 60 to 65, the pulse 120, and the temperature between 104° and 105°, the patient may seem in a truly desperate condition, and it would appear rational to attribute the urgent dyspnœa and the slight cyanosis to the mechanical interference with the interchange of gases in the lungs. But on the following day the dyspnœa and the cyanosis may have disappeared, the temperature is normal, and the pulse-rate greatly lessened, and yet the physical condition of the lungs remains unchanged. We witness no more striking phenomenon than this in the whole range of clinical work, and its lesson is of prime importance in this very question, showing that the fever and the toxins rather than the solid exudate are the essential agents in causing the cardio-respiratory symptoms.

Of course, there are cases in which the exit of air is gradually and effectually shut off by progressive consolidation until ultimately a point is reached in which the patient is simply smothered, and literally dies from want of breath. It is difficult to say how much breathing-area is needed to maintain life. That a man can get along with very little, if the removal takes place gradually, is shown by cases of progressive tuberculosis of the lungs. In pneumonia recovery is not infrequently seen after consolidation of one lung; rarely after consolidation of one lung with one lobe of the other. One occasionally meets with cases in which both lungs are almost completely solidified. In Case 49 of my series of autopsies the left lung, with the exception of the anterior border, was in a state of uniform red hepatization; while the right was in a state of gray hepatization, with the exception of a still smaller portion of the anterior margin. In these cases the dyspnœa is usually urgent and distressing, and the cyanosis early and pronounced; while the cerebral features of the disease may be completely absent. But even here we must be on our guard against a too mechanical conception of the process. While theoretically we may suppose great obstruction to the pulmonary circulation to exist in consequence of the compression of the alveolar capillaries by the exudate, it has been shown by the well-known experiments of Welch that it is exceedingly difficult to raise the blood-pressure in the pulmonary artery by cutting off territories of the circulation in reality much more extensive than are ever involved in pneumonia.

As I have already mentioned, in speaking of the remarkable phenomena associated with the crisis, additional factors must be considered, namely, the weakening influence of the fever on the heart-muscle and the depressing effect of the toxins on the cardio-respiratory centres. This explains in part, too, why we do not get such satisfactory results from venesection in pneumonia as in similar conditions of dilatation of the heart with cyanosis, in emphysema, arteriosclerosis, and valvular

disease. While it is rare in the one to see even copious venesection followed by relief, in the others the good effects are often most striking.

The toxæmia outweighs all other elements in the prognosis of pneumonia; to it (in a gradual failure of strength or more rarely in a sudden death, as in the cases here given) is due in great part the terrible mortality from this common disease, and unhappily against it we have as yet no reliable measures at our disposal.

A CLINICAL, PATHOLOGICAL, AND EXPERIMENTAL STUDY OF FRACTURE OF THE LOWER END OF THE RADIUS WITH DISPLACEMENT OF THE CARPAL FRAGMENT TOWARD THE FLEXOR OR ANTERIOR SURFACE OF THE WRIST.[1]

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IT is believed by many that forward displacement of the lower fragment in fractures of the base of the radius is of rarest occurrence, and that the backward or dorsal displacement is almost universal. While it is true that the latter is the common deformity, the forward displacement happens in a considerable number of instances.

The usual, or so-called classical, fracture of the radial base, to which the name of Colles has been attached by English writers, generally, if not always, occurs because the patient receives the force of a fall upon the palmar surface of the hand. The displacement is the result not of muscular action, but of the vulnerating-force, and the relative position of the fragments will be practically always the same if the force has been sufficient to cause separation of the fracture-surfaces The exact line of break will make little difference, because the muscular surroundings have so little to do with the causation or continuance of the distortion. In this injury the lower fragment is driven backward toward the dorsal surface of the forearm.

Displacement of the lower fragment in the opposite direction—that is, toward the flexor aspect of the wrist—would probably be equally common if the force in falls was received so frequently on the back of the hand.

I have seen no fracture immediately after its receipt in which forward displacement has taken place; but on three occasions I have seen old

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[1] Abstract of a paper read by title at the meeting of the American Surgical Association, May, 1896.

fractures which seemed to have been injuries of this kind. The literature of the subject is scanty, but I have collected a number of recorded cases, and have obtained accounts of others by personal correspondence. A limited search in museums has been rewarded by the discovery of a fairly large number of specimens, most of which, however, have come from dissecting-rooms, and have, therefore, no clinical history.

The scarcity of reported cases is, without doubt, due to the fact that the younger members of the medical profession have, as a rule, charge of the hospital-dispensaries, where the great proportion of forearm fractures are treated; while the older surgeons, who would be more likely to recognize the interest of an unusual deformity, have comparatively little opportunity to study such injuries critically.

Old injury to the wrist, believed to be fracture of the lower end of the radius, with anterior displacement of the carpal fragment. (Author's first case) A man, J. Mc.D., aged about thirty years, received an injury to the right wrist in the early part of 1891, which was about eighteen months before I made the cast of his forearm and hand. He was unloading lumber from a car, and by some of the lumber falling was thrown around in such a manner that he struck his right hand against the corner of the car, and, to use his own expression, "put it out." Immediately after the injury his associates "pulled it into place."

Fig. 1.

Radial side of wrist. Case I.

I was unable to get an accurate account of the exact position of the hand at the time of the injury, but the patient seemed to think that it was bent backward and not forward. He seemed quite certain that the force was not applied to the hand in such a way as to flex it.

Fig. 2.

Ulnar side of wrist. Case I.

Some time after the injury, when the swelling had largely disappeared, he was sent to me by Dr. J. P. McCleery, of Milton, Pa. I concluded that the injury had been a fracture of the lower end of the radius, with the lower fragment displaced forward, and that union had taken place with the fragments in malposition because reduction had

not been accomplished. I determined to attempt refracture of the deformed union with the object of obtaining a better apposition of the fragments.

The head of the ulna seemed prominent on the dorsal surface of the wrist, very much as in the ordinary fracture of the lower end of the radius with backward displacement. There was marked prominence on the palmar aspect of the wrist, which did not involve the lower end of the ulna. Above this prominence—that is, toward the elbow—I could push my fingers deeply inward toward the shaft of the radius,

FIG. 3.

Radial side of wrist. Case II.

and it seemed as if there was quite a steep ledge of bone a short distance above the line of the wrist-joint, such as would be caused by the lower fragment lying in front of the shaft of the bone. The prominence was very hard and was covered by the flexor tendons, which could be felt coming over the edge of the supposed displaced fragment and to a certain extent concealing its outlines. The back of the wrist at the radial side presented no special change. While the patient was in the city awaiting treatment he became intoxicated, and suddenly went home.

Old injury of the right wrist shown by skiagraphy to have been fracture of the lower end of the radius with forward displacement of the carpal fragment. (Author's second case.) In April, 1894, I had under my

FIG. 4.

Ulnar side of wrist. Case II.

care at the Woman's Hospital a woman, aged thirty-nine years, who, about twenty months previously, had fallen down a stairway into a cellar. Voluntary extension and flexion at the wrist were impaired, and pronation and supination almost, if not entirely, absent. Passive pronation and supination could be made to a slight extent, but caused pain. There was abnormal deflection of the hand to the radial side, due to shortening of the bone, such as is seen after the ordinary fracture of the base of the radius. The ulna was abnormally prominent on the back of the wrist and the carpus on the ulnar side seemed to be displaced forward. The outside of the head of the ulna seemed to be a little irregular, as if there might have been some slight fracture there.

The tendons of the radial flexor of the wrist and of the long palmar muscle were exceedingly prominent on the palmar aspect of the forearm

FIG. 5.

Skiagraph.

FIG. 6.

Skiagraph.

near the wrist-joint. At the ulnar side of these tendons was felt upon firm pressure a hard mass, apparently of bone. On the back of the wrist below the head of the ulna, and crossing over to the radial side, a distinct transverse groove was felt by deep pressure. It was either in the carpal region or at the lower end of the radius. This gave the impression that for some reason the carpal bones, with perhaps a detached piece of the radius, occupied a more anterior position than normal.

The discovery of the permeability of the soft parts of the human body to the Röntgen ray has recently given me opportunity to prove the correctness of my diagnosis. The skiagraphs taken for me by Prof. Goodspeed show that the injury was a fracture with anterior displacement similar to the specimen in the cabinet of the New York Hospital, described in a later part of this essay.

Probable fracture of the lower end of the radius with forward displacement due to extreme flexion of the wrist. (Author's third case.) I recently met, socially, a young physician who had injured his left wrist a year and a half previously while playing foot-ball. He said that while passing the ball from his left hand to his right side he was tackled and grasped by the left thigh. His left wrist was flexed at the time. He fell with his left arm and hand under him, and felt something snap at his wrist as the joint was forcibly flexed between his body and the ground. The deformity consisted, he says, in the hand being displaced forward. His companions pulled on the hand to overcome the deformity, believing that he had sustained a dislocation of the wrist. He says that there was no "snap," such as is heard when a dislocation is reduced. A physician who examined the limb afterward obtained no crepitus, and thought no fracture had occurred; though the patient himself was convinced by the sound at the time of injury and his sensations that fracture had taken place. He thought it involved the carpal bones.

When I met this gentleman there was a marked thickening of the lower end of the radius in the antero-posterior diameter; and a hard projection could be felt under the flexor tendons. I have little doubt that he sustained a fracture of the radial base, with forward displacement of the carpal fragment. The displacement was either not great, or was partially, but not completely, reduced immediately after its occurrence, by efforts to reduce a supposed luxation.

FIG. 7.
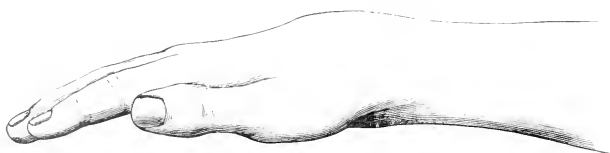
Radial side of wrist. From cast of case of Prof. E. H. Bennett, Dublin.

I have collected by correspondence histories of twelve other cases occurring under the observation of Dr. F. N. Drake, of San Francisco; Dr. T. E. Nott, Jr., of South Carolina; Dr. J. Clark Stewart, of Minneapolis; Dr. W. G. Johnston, of Pennsylvania; Dr. E. K. Sprague, of U. S. Marine-Hospital Service; Dr. J. R. Lehman, of

Pennsylvania ; Dr. W. M. Mastin, of Mobile ; Dr. C. H. Mastin, of Mobile ; Dr. J. McF. Gaston, of Atlanta ; Dr. John H. Packard, of Philadelphia ; Dr. J. S. Wight, of Brooklyn. These cases, I believe, have never been published.

After a very thorough search in surgical literature I have discovered nine other cases reported. This makes with my own three cases a series of twenty four clinical histories. In addition to these clinical reports of special cases I have letters from a number of surgeons stating that they recollect seeing such fractures, but have no detailed notes of the patients at hand. They are Dr. John Ashhurst, Jr., Philadelphia ; Dr. A. C. Cabot, Boston ; Dr. R. F. Weir, New York ; Dr. J. William White, Philadelphia ; Dr. J. M. Barton, Philadelphia ; Dr. Roswell Park, Buffalo ; Dr. John M. Parmenter, Buffalo ; Dr. Carl Gussenbauer, Vienna ; Dr. W. S. Halsted, Baltimore ; and Mr. Thomas Bryant, London.

FIG. 8.
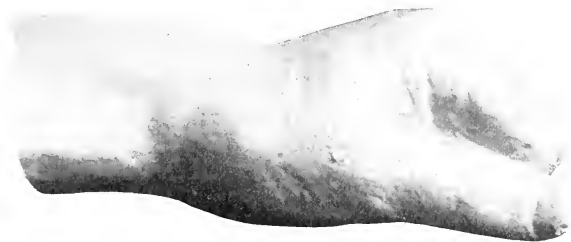
Photograph of cast of the case described by R. W. Smith in his *Treatise on Fractures in the Vicinity of Joints.* Cast obtained from Prof. E. H. Bennett, of Dublin.

On the other hand, the injury has not been seen, or at least the fact of seeing it is not recollected, by Sir James Paget, London ; Max Schede, Bonn ; Sir William MacCormac, London ; Sir Joseph Lister, London ; F. C. Abbott, London ; Mr Clutton, Mr. Pitts, Mr. Battle, and Mr. Stabb, London ; Prof. John Chiene, Edinburgh ; Dr. Fordea, Hamburg ; and Prof. V. Czerny, Heidelberg.

When I began this study I believed that the injury under consideration was rare, and it was my intention to make a rather extensive search in the various medical museums for specimens. I have been deterred from this step, however, to a considerable extent, because I soon found that museum-specimens illustrating the lesion were not so exceedingly uncommon as I had supposed.

I give a note of the specimens with which I am acquainted.

SPECIMEN 1. *Probable epiphyseal fracture with moderate displacement.* (Mütter Museum, Philadelphia. No. 1277⁵⁵.) Lower end of right radius and ulna, showing the lower portion of the radius displaced forward after fracture.
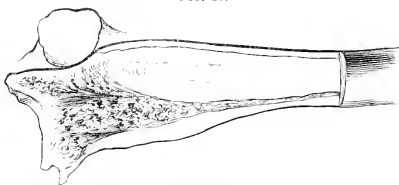
SPECIMEN 2. *Fracture with probable stripping up of the periosteum.*
(Mütter Museum, Philadelphia. No. 1277[60].)   Lower end of right
radius and ulna, showing anterior displacement of the lower end of the
radius and dislocation backward of the head of the ulna.

FIG. 9.
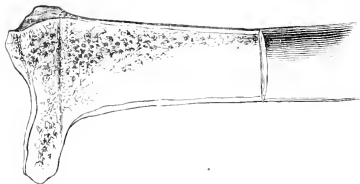
Specimen 1.   Mütter Museum.

FIG. 10.

Specimen 2.   Mütter Museum.

SPECIMEN 3. *Oblique fracture with displacement.* (Mütter Museum,
Philadelphia. No. 1277[65].)   Bones of right forearm and hand.   Ob-
lique fracture of the lower end of the radius, involving the joint.
The lower fragment embraces the styloid process, the outer portion of
the articular surface, and 1.5 cm. of the external border.   Absorption
and upward displacement of the lower fragment allowed the hand to be

FIG. 11.
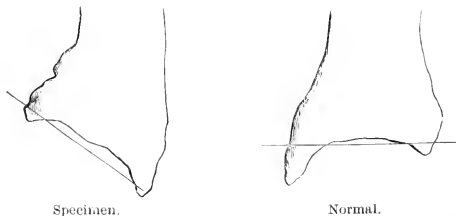

Specimen.   Normal.

Diagram showing change in direction of articular surface in Specimen 3.   Mütter Museum.

carried away from the ulna.   Union has occurred with a slight amount
of callus; the bone is smooth anteriorly, but is marked by an oblique
groove posteriorly.   The displacement here is forward.   The lower end

of the radius is much altered by the great amount of absorption at the line of fracture. The articular surface presents obliquely toward the radial side of the forearm, so that its plane marks an angle of perhaps 40° with the normal plane.

SPECIMEN 4. *Fracture with very marked deformity.* (Museum Royal College of Surgeons, Edinburgh.) This characteristic specimen was
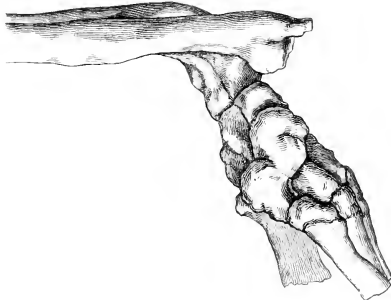
FIG. 12.
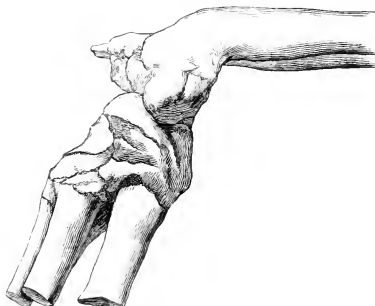
Specimen 4. Edinburgh.

obtained from a subject in the dissecting-room by Mr. Cathcart, to whose kindness I am indebted for the photographs from which the cuts have been made.

FIG. 13

Specimen 4. Edinburgh.

SPECIMEN 5. *Fracture with angular displacement.* (Museum St. Thomas's Hospital, London.) Mr. F. C. Abbott has sent me two photographs of this specimen, which is the right radius. The catalogue of the museum states : " Union has occurred with a rare displacement of the lower fragment, which is tilted forward instead of backward. The articular surface presents no trace of having been involved in the fracture." The last statement evidently refers to the lower articular surface,

for Mr. Abbott writes that the articular facet for articulation with the ulna is distinctly involved in the line of fracture. Fig. 14, which represents the bone with the interosseous ridge toward the reader, shows the marked displacement forward—toward the right in the figure—the fracture-line involving the lateral articulating facet. The fracture

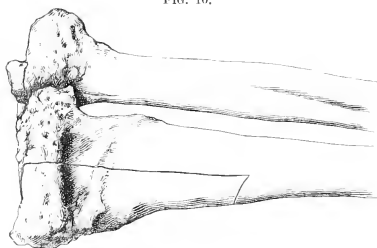FIG. 14.

Specimen 5. St. Thomas's Hospital, London.

FIG. 15.
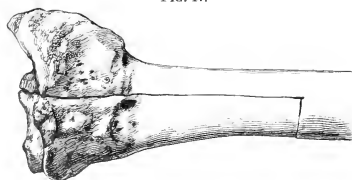

Specimen 5. St. Thomas's Hospital, London.

appears to have been a comminuted one. The second figure gives us another view of the bone. The specimen is doubtless the one shown at the London Pathological Society some years ago by Samuel G. Shattock.

FIG. 16.

Specimen 12.

FIG. 17.

Specimen 13.

SPECIMEN 6. *Fracture with impaction.* (Museum Westminster Hospital, London.)

SPECIMEN 7 is in St. Bartholomew's Hospital, London.

SPECIMENS 8 and 9 are in Queen's College Museum, Belfast.

SPECIMEN 10 is shown by a cut in Voillemier's Clinique Chirurgicale.

SPECIMEN 11 is an experimental fracture recorded by F. H. Hamilton.

SPECIMENS 12, 13, 14, 15, 16, 17, and 18 are mentioned by E. H. Bennett, of Dublin, in *Transactions* of the Royal Academy of Medicine in Ireland, vol. x. 323, to whom I am indebted for photographs of the specimens.

FIG. 18.
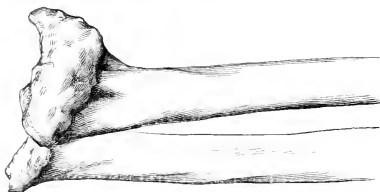
Specimen 14.

FIG. 19.
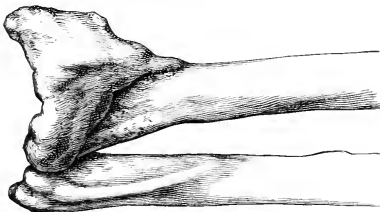
Specimen 15.

FIG. 20.
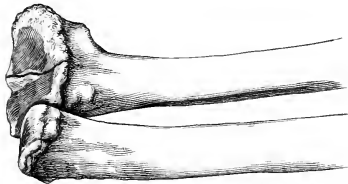
Specimen 16.

SPECIMEN 19 is preserved in Museum of Royal College of Surgeons in Ireland, and through the kindness of Mr. J. Alfred Scott I have obtained photographs and a cast.

SPECIMENS 20 and 21 are figured by Bardeleben.

Fig. 21.

Specimen 17.

SPECIMEN 22 is preserved in the Pathological Cabinet of the New York Hospital. It is especially valuable, for the muscles have been preserved. I am indebted to Dr. Ferguson, the pathologist of the hospital, for the photograph of this beautiful and instructive specimen.

Fig. 22.
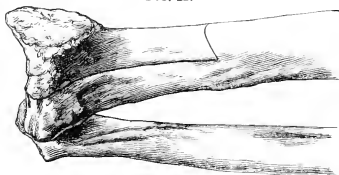
Specimen 18.

SPECIMEN 23 is a plaster-cast of the form of fracture contained in the cabinet of the New York Hospital.

Fig. 23.
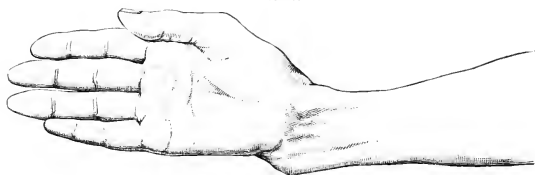
Specimen 19.   Royal College of Surgeons in Ireland.

SPECIMENS 24, 25, 26, 27, 28, and 29 are in the Warren Anatomical Museum, Boston. Photographs in my possession were obtained from Dr. W. F. Whitney.

SPECIMENS 30 and 31 are in the Musée Dupuytren at Paris.

EXPERIMENTAL OBSERVATIONS. Ten experimental fractures were made on the cadaver to aid me to reach a conclusion as to the causation of this radial fracture with forward displacement. The details need not be here enumerated. In some of the experiments the carpal bones were fractured and the radius remained uninjured.

FIG. 24.
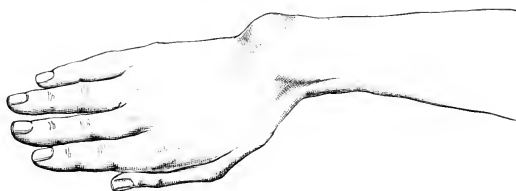
Specimen 19. Royal College of Surgeons in Ireland.

FIG. 25.   FIG. 26.
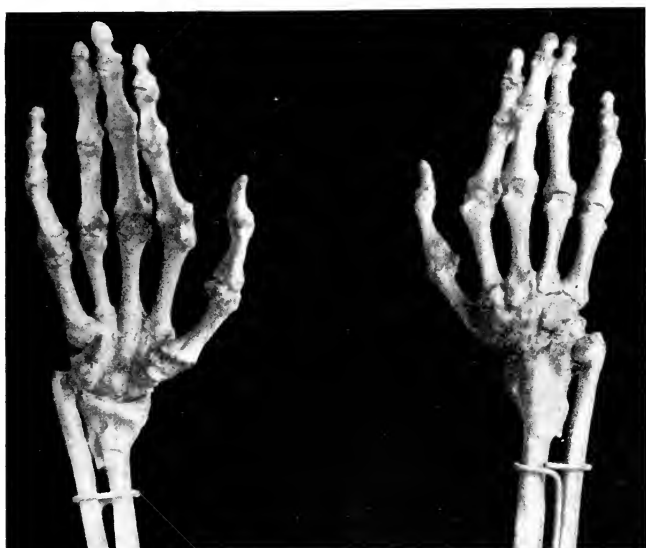
Palm. Specimen 19.   Dorsum. Specimen 19.
Specimen in Royal College of Surgeons in Ireland. In this specimen the lateral displacement
is very great.

CAUSES AND MECHANISM OF THE INJURY. A study of the twenty-four clinical histories shows that in eleven cases the reporters attributed the injury to violence applied to the back of the hand and wrist. In four of these the opinion of the reporter was founded upon, or confirmed by, the occurrence of abrasions or bruises on the dorsal surface of the limb.

In ten cases no satisfactory account is given of the manner in which the force was applied.

In two instances it seems as if the violence may have been received on the palmar surface of the hand and wrist, though in neither of them is the evidence very convincing.

In one case it seems as if the injury was the result of extreme flexion.

I believe that a frequent cause of this fracture with forward displacement is extreme flexion of the radio-carpal joint, by which a portion of the base of the radius is torn off by a sort of cross-breaking-strain due to the fact that the dorsal ligaments retain their integrity. The continuation of the vulnerating-force after the fracture occurs gives rise to varying degrees of forward displacement of the carpal fragment. This was well shown in Experiment 1, in which I produced an epiphyseal fracture by forced flexion, but in which there was at first little forward displacement. By applying more power in a similar direction I was enabled to increase considerably the amount of displacement.

It is quite possible that fracture and anterior displacement may occur without flexion of the joint by direct violence applied to the posterior surface of the lower end of the radius.

Although my experiments numbered 2, 3, and 4 show that extreme flexion may cause fracture of the carpal bones, other experiments in the series show that, if the lower end of the radius is made relatively weak, the fracture occurs through the radius instead of in the carpus.

It is intelligible that the injury under discussion might be occasioned by the hand and wrist being held in machinery or caught in a hole while the arm of the patient was forcibly thrown in a dorsal direction. Such a mechanism is evidently not the usual one.

Lecomte's belief, that the radius is broken in this injury by falls upon the palm and that the anterior displacement is due to a secondary force applied on the posterior surface, will scarcely be accepted at the present day. It requires a more complicated mechanism than the opinion that the fracture and displacement are produced by one and the same force, applied upon the dorsum and causing overflexion. One of my experiments shows that forward deformity may be produced by extreme flexion after extreme extension has broken the radius.

My experiments on the cadaver just detailed, and analogy with the causation of fractures of the radial base with the usual backward displacement, seem to show that the fracture with anterior displacement is caused in three ways: 1. Tearing off of the lower end by a cross-breaking-strain exerted through the posterior ligaments during extreme flexion, when the force is applied to the back of the hand in front of the anterior surface of the radius. 2. Crushing of the anterior portion of the bone between the wrist-bones and the shaft, or mutual penetration of the diaphyseal and epiphyseal portions. 3. Rupture of the

bony tissue at the weakest point by decomposition of the force to which the limb is subjected.

It is probable that the fracture may be caused by any one of the three methods mentioned; but fracture at the weakest point of the radius and carpus by decomposition of forces seems to me to be probably the most common mechanism. The osseous injury is in some cases due perhaps to a combination of more than one method.

It is interesting to note that in one of Callender's cases fracture occurred from muscular contraction due to galvanic stimulation of the muscles. This was without doubt produced by the strong flexor muscles being too powerful to be successfully resisted by the relatively weak extensors, and the bone gave way at the epiphyseal line.

The muscles have indirectly some indefinite agency in the production of the lesion in the living subject, for by their normal tonic tension they keep the elbow-joint and wrist-joint fixed. They have also, I believe, some effect in limiting anterior displacement, for the extensor muscles are drawn tensely over the dorsal surface of the lower end of the radius as soon as the lower fragment attempts to move forward. This was shown well in my experiments on the cadaver. This restrictive influence would seem to be less operative in backward displacements, because the concavity of the anterior surface of the radial base does not afford the flexor muscles the same opportunity as that given the weaker extensors by the almost flat dorsal surface.

These various considerations have led me to the opinion that no one of the three methods of fracture detailed is exclusively responsible for all the cases.

Fracture with anterior displacement can occur from a splitting-force exerted on the articular surface of the radius by the first row of carpal bones being driven up against it. This is beautifully shown in my Experiment 10.

SYMPTOMS AND DIAGNOSIS OF THE INJURY. A study of the reported cases and specimens gives considerable light on the symptomatology of this fracture.

The injury appears to occur more frequently on the right side—a circumstance probably due to the fact that most persons, when falling, involuntarily use the right hand and arm for protection.

The line of fracture may be transverse or oblique. If oblique, it may run upward and inward or upward and outward. It may be so oblique upward and inward as to give to the upper fragment of the radius a sharp end, which will resemble the normal styloid process. This point, situated higher up the limb than the styloid process, may be driven into the lower layers of the skin, as in Poirier's case,[1] and cause a

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[1] Revue de Chirurgie, 1894, xiv. p. 576.

dimpling of the integument. It is conceivable that a greater vulnerating-force would cause an open fracture by driving the sharp fragment through the skin.

It is quite probable that the plane of the fracture runs obliquely upward from the dorsal to the palmar surface of the bone, since this direction would be rather more apt to permit sliding of the carpal fragment forward. This argument is, however, not very strong, because the displacement is principally due to the vulnerating-force, and not to muscular traction causing overriding.

· The break seems to occur generally at a distance from the articular surface of from one-half to one and one-half inches. In the specimen in the Museum of the Royal College of Surgeons in Ireland the line of fracture on the ulnar side of the radius is, however, one and three-quarters inches above the joint, and runs obliquely downward and outward until, at the radial side of the radius, it is apparently about one and one-quarter inches from the joint-surface. Specimen 1 seems to prove that the solution of continuity may be even nearer the joint than one-half inch, and there is no reason known to me why the line might not be very near. I have produced in the cadaver fracture with backward displacement and fracture with forward displacement, in which the line was only about one-quarter inch from the joint.

It is admitted, I think, that occasionally only the anterior edge of the lower end of the bone may be chipped off as was suggested by Barton, when he erroneously asserted that this chipping-off occurred at the posterior lip of the articular surface in the ordinary injury in this situation. Such injuries must, however, be excessively rare at the anterior margin of the radius, since they are almost unknown even in the fracture with posterior displacement. I have produced this injury in the cadaver.

Involvement of the articular surface with lines of comminution apparently occurs somewhat rarely. It is probable that it requires unusual force to cause such comminution of the lower fragment, and that the mechanism of its production is often an intrusion or impaction of the upper fragment into the lower.

The displacement of the lower fragment varies greatly. It is evident that there may be none. In some cases the displacement forward is comparatively slight, while the tilting or displacement laterally toward the radial or outer border of the arm is very marked.

The bending forward seen in the skiagraph of Case II. and in Specimen 22 would seem likely to occur in young bones only; but the age of the patient described as Case II. was between thirty-five and forty years at the time of the injury. It is possible that this condition occurs in adult bones by the anterior edge of one fragment being driven into the cancellated tissue of the other fragment, so that there

is little separation of the fragments on the dorsal surface. Union occurring without reduction might then give the appearance of the bone having been bent when soft.

It is possible for the carpal fragment to be thrust forward bodily, without crushing occurring or angular displacement taking place. In this instance the fractured surfaces would seldom entirely pass each other.

This form of displacement would be expected to give to the examiner's fingers the impression of a distinct mass of bone under the flexor tendons. Perhaps the upper edge or the obliquely placed palmar surface of the carpal fragment might be distinctly felt. In my first patient this was the impression conveyed to my fingers. The side of the lower fragment toward the ulna may sometimes remain in something like its normal relation to the shaft of the radius by reason of the radio-ulnar, the internal lateral, and the triangular ligaments being more or less uninjured.

Angular displacement may perhaps occur by the bone bending at the posterior surface as on a hinge, and the anterior portion being crushed or undergoing penetration or impaction. This would cause the articular surface to present abnormally downward and forward and give the appearance seen in several of the specimens.

It is also possible that the hinge-like motion between the fragments may occur at the anterior face of the radius, and the line of fracture be thereby opened on the dorsal aspect of the bone. It is possible that the open fissure would become filled and obliterated by callus if the fragments were left unreduced.

I have seen this opening of the fracture on the dorsum produced in my experimental fractures by rocking the fragments in endeavors to increase the deformity.

FIG. 27.

Fracture of lower end of radius with dorsal displacement of carpal fragment. Compare with Figs. 3, 4, and 8.

Whether the carpal fragment is displaced directly forward in a plane at right-angles to the horizontal plane of the radius, is tilted forward as upon a hinge at the flexor surface of the shaft, or is displaced laterally, with or without much forward distortion, seemingly depends upon the line in which the osseous fibres give way and the manner of application of the vulnerating-force.

The deformity of the forearm and wrist is characteristic in instances

where the carpal fragment is much displaced forward.   An elevation is seen running across the back of the forearm obliquely upward from the ulnar to the radial side.   The ulnar portion of this elevation is the more prominent, and is made by the head of the ulna, which was left behind when the carpal fragment of the radius with the attached hand was carried forward by the injury.   On the radial side of the limb the elevation is further from the hand and is less prominent.   It is due to the lower end of the upper fragment of the radius.

FIG. 28.

Experimental fracture with dorsal displacement in cadaver, showing elevation at back of wrist and projection of lower end of upper fragment on palmar surface.

This dorsal prominence is quite different in appearance from the hump on the radial side of the dorsum seen in fracture of the lower end of the radius with backward displacement of the carpal piece.   In the latter case the elevation is great on the radial half of the limb, and the surgeon's finger carried along the back of the shaft of the radius can readily feel the ledge of bone corresponding to the upper portion of the lower fragment.   The ulna makes little or no prominence on the back of the forearm in the classic fracture; though in both forms it is apt to be prominent on the ulnar edge of the limb, because the outward displacement common in both instances carries the hand away from the head of the ulna.

FIG. 29.

Forearm

Hand
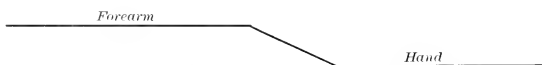
Diagram of Deformity in Fracture with Forward Displacement

Forearm

Hand

Diagram of Deformity in Fracture with Backward Displacement

In the fracture under consideration the surface slants downward from the dorsal elevation toward the back of the hand, whose plane is at a lower level than that of the forearm, but more or less parallel to it.

The occurrence of these three planes in the fracture with forward displacement is due to the movement normally allowed between the dis-

placed articular surface of the radius and the first row of carpal bones and between the first and second rows of carpal bones. The articular surface of the radius is displaced so that it looks forward. Therefore the extensor muscles cause the first row of carpal bones to roll backward and give rise to a similar movement between the two carpal rows. This slant in the surface below the dorsal elevation causes somewhat the appearance of a furrow across the forearm, which is deeper just below the head of the ulna. Pressure with the fingers will make this hollow more evident and show that the lower end or base of the radius occupies a position more anterior than normal. This sulcus, like the elevation, is a little further from the hand on the radial side.

On the palmar surface there is some prominence, due chiefly to the lower fragment, but it is less marked than the elevation seen on the dorsum. This is probably due to the fact that when the hand is carried forward with the base of the radius the flexor tendons must span the arch made by the broken radius and the carpus. They thus obscure the deformity in the bony outlines, which would be made conspicuous if the palmar surface of the radius was normally flat like the dorsal surface. In the fracture with dorsal displacement the overlying tendons are pushed up and increase the elevation; in the fracture with palmar displacement the tendons are stretched across an abnormally great arch, and therefore conceal to a certain extent the change in the contour of the bone.

The pisiform bone makes, however, it is said, a more pronounced elevation than normal. This is intelligible when it is remembered that the ulna and the hand have parted company, as it were.

The lower fragment may perhaps be felt as a hard mass under the flexor tendons. It seemed as if this were pretty clearly established in my case marked I. The prominence and hard mass will be disconnected with the lower end of the ulna. This point aids in distinguishing the injury from fracture of the lower end of both radius and ulna. In my patient (II.) the normal hollow on the palmar surface just above the base of the thenar eminence is absent, and bone can be felt there. This obliteration of the hollow is probably due to the rotated scaphoid and trapezium.

The great deepening of the normal curve of the palmar surface of the lower end of the radius would seem to be a necessary feature of cases in which the lower fragment was simply tilted forward or the bone bent as in Specimens 22 and 28. It is conceivable that the base of the radius might be broken from the shaft and displaced forward, but so rotated on its transverse axis that its articular surface for the carpus would present somewhat dorsally, instead of being made ot look more toward the flexor surface than normal. Such a displacement would probably obliterate instead of increase the normal arch of the palmar

surface of the radius. Comminuted fractures would be likely to cause irregular distortions and increased masses of callus.

The lateral deformity which is usual is deviation of the hand toward the outer or radial side of the forearm. This sometimes causes a concavity of the lower part of the radial border, and is due to the shortening of the radius from the crushing of the bony tissue or from the outward tilting of the lower fragment in oblique fractures. In Poirier's case the hand had a tendency to deviate to the ulnar or inner side of the arm because the line of fracture ran obliquely downward from the ulnar to the radial edge of the bone. This is apparently very rare. The specimen in the Museum of the Royal College of Surgeons in Ireland shows deviation to the radial side, which is the common form, in an excessive degree. In fact, there is very little forward displacement in this specimen.

The tendon of the ulnar flexor of the carpus which is inserted into the pisiform bone becomes prominent in the fracture under consideration, as would be supposed from the statement made previously that the pisiform bone becomes more projecting than in the normal hand. In one of my cases (II.) the tendons of the radial flexor of the carpus and the long palmar muscle stand out quite prominently at the wrist.

Careful observation of patients with this fracture will, I think, show that there is a tendency for the base or upper border of the thenar eminence to ascend toward the elbow, because of the relative shortening of the radius. The upper margin of the hypothenar eminence is usually, I think, in uninjured limbs nearer the elbow. Hence a line drawn across from the upper margins of these eminences, when the axis of the hand corresponds with the axis of the forearm, will generally be oblique, with the ulnar end nearer the elbow. In this fracture the line will be more or less transverse, or perhaps have its radial end nearer the elbow. This displacement, of course, depends on the change in length of the radius and the outward deviation of the lower fragment.

The deflection of the hand radially causes, necessarily, the head of the ulna to become very prominent on the inner or ulnar border of the lower part of the forearm. It is also prominent on the back of the arm. If the lower fragment is displaced very much, both inward and forward, the ulnar head becomes prominent both dorsally and at the ulnar border of the arm. If the forward displacement alone is great, the projection of the ulnar head is chiefly backward. If the displacement of the carpal fragment is mainly outward, the projection of the end of the ulna is noticeable chiefly on the ulnar side of the limb. Variations from these extremes occur with the varying directions of displacement of the carpal portion of the radius.

The transverse diameter of the forearm at the region of fracture is not likely to be much increased in this fracture. The antero-posterior

diameter, however, may be a good deal greater in the injured than in the normal arm. This would be expected particularly in patients in whom the lower fragment was displaced forward as a whole, and not simply tilted. In great comminution of the lower fragment the increased thickness of the forearm in the antero-posterior diameter would probably be quite marked, if the fracture were not properly reduced, and the small pieces of bone were welded together by a mass of callus.

A careful examination of the styloid process of the radius will show in all cases, except those in which there is no displacement of the lower fragment, that this process has been displaced forward. It very often will also be displaced outward. Its most readily observed change in position, however, is the elevation toward the elbow due to the bending, to the impaction, or to the crushing of bony tissue.

The styloid process of the ulna may be broken off at the time of injury. Specimen 2 is an illustration of this complication, for the styloid process of the ulna is seen to have been the seat of a fracture, though it is now united to the head of the bone.

The force which carries the hand at the time of fracture away from the ulna may cause the styloid process of that bone to tear through the skin.

FIG. 30.

Diagram showing the relation of carpus and ulna in specimen in New York Hospital.

The articulating surface of the radius cannot be made out by palpation in fracture with forward displacement, as in dislocation forward of the carpal bones. Its plane is in fracture carried forward. This would cause the hand to assume the appearance of flexion of the wrist joint, if it were not that the extensor muscles have a tendency to cause extension between it and the first row of carpal bones, and between the two rows of carpal bones, and thus bring the hand into a plane corresponding approximately with that of the forearm. This condition is particularly noticeable in the specimen belonging to the New York Hospital (22). The way in which the articular surface looks obliquely forward is beautifully shown in the specimens from the Royal College of Surgeons of Edinburgh (4).

No lateral motion is to be expected between the carpal bones and the

lower end of the radius, since the lateral ligaments, which prevent lateral mobility in the normal joint, are not disturbed by the lesion.

The carpus in these fractures seems to be shortened. This is probably due to the fact that the head of the ulna overrides the carpus, and that the lower fragment of the radius is displaced somewhat upward as well as forward. The carpus, of course, follows the radial fragment, and is displaced forward and usually outward.

In recent fractures voluntary movement is more or less restricted because of pain or fear of pain. In old cases in which reduction has been neglected stiffness in flexion, extension, and rotation is to be expected.

Preternatural mobility would be obtainable in comminution of the lower fragment in fractures where the periosteum was greatly lacerated, and, indeed, in most fractures where there was no impaction. In incomplete, or green-stick, fractures it would, of course, be unobtainable until the fracture was made complete.

The point of mobility and the point of pain on pressure will be in the neighborhood of from a half to one inch and a half above the joint. Firm pressure at this point will aid in the diagnosis where there is no special deformity or great mobility. In sprains the point of intense pain on making pressure with the finger will be over the joint, which is lower down than the point at which pain is experienced when a fracture exists.

Crepitus will be obtained in fractures in which mobility is present, but will not be demonstrable, or demonstrable only with difficulty, in cases in which there is little periosteal laceration. In cases of impaction the force applied to reduce the deformity and readjust the fragments will give a coarse, grating crepitus when the lower fragment is pushed backward into place.

The fracture will be easily reduced if sufficient force be used, but it requires a good deal of pressure applied directly over the flexor surface of the lower fragment accompanied by extension and counter-extension, and sudden extreme extension in a dorsal direction. At least, this is my belief from my experience in reducing the fracture with backward displacement.

There would be, I should think, little tendency for the deformity to recur after proper readjustment of the fracture. It may be thought that in this respect the injury would resemble a dislocation of the carpus with displacement in the same direction, but the reduction of the fracture is not accompanied by the sudden snapping noise which is heard when a dislocated carpus is reduced.

The fracture may be accompanied by such laceration of soft parts as to convert the injury into an open or compound one.

Fracture of the radial base with forward displacement may be mis-

taken for sprain of the wrist or contusion. Inflammatory thickening of the soft parts after contusion may greatly resemble fracture.

Backward dislocation of the carpus resembles fracture with backward displacement of the inferior fragment, and is not likely to be mistaken for fracture with forward displacement.

Forward dislocation will produce a deformity resembling in some respects that resulting from fracture with displacement forward. In most cases, however, the surgeon will probably have little trouble in distinguishing between fracture with forward displacement and forward luxation of the carpus. In the former the lower border of the dorsal prominence runs obliquely upward across the back of the lower part of the forearm from the ulnar to the radial side, being constituted by the head of the ulna and the lower end of the upper radial fragment. In the dislocation the elevation is either transverse or runs obliquely downward from the ulnar to the radial side, and is constituted by the articular ends of the radius and ulna.

In dislocation forward of the carpus the hand, according to Stimson,[1] may occupy any position between moderate dorsal and palmar flexion, the latter being more common; and the fingers are slightly flexed. I have never seen the injury, but would have expected slight dorsal flexion to be more common, especially if the carpus was displaced upward to any great degree. The greater strength of the flexor muscles, as compared with the extensors is, I presume, the explanation of the tendency to flexion of the wrist.

In this dislocation there is a marked hollow at the back of the wrist below the lower ends of the radius and ulna, which form an abrupt ending of the plane of the back of the forearm, running nearly transversely across the limb. There is a prominence at the front of the wrist under the flexor tendons. Perhaps the upper border of this prominence may be felt as a convex mass extending entirely across the forearm. The hand has the appearance of being shortened, and the distance from the styloid process of either side to the corresponding metacarpal knuckle will be found to be less than normal. The wrist will be decidedly increased in its antero-posterior diameter. The injury is probably rarer than fracture with anterior displacement of the lower fragment, but must be remembered as a possibility. A still rarer injury is incomplete dislocation forward of the carpus, in which the scaphoid and semilunar bones leave the radius, but the cuneiform bone maintains its normal relation with the triangular cartilage and head of the ulna.

Attention to the variations in the deformity, and a careful examination of the bony landmarks and of the relations of the two styloid

processes to each other and to the bones of the hand, will probably enable the surgeon to determine whether the injury in a given case is a forward dislocation or a fracture with anterior displacement. The snap with which the dislocation is reduced and the rapid acquirement of normal voluntary movement will point to dislocation. The grating crepitus felt when the fracture is reduced, the subsequent thickening from callus, and the delay in regaining motion will point to fracture.

TREATMENT OF THE INJURY. The treatment consists in immediate and complete reduction of the fracture, followed by a retentive dressing which will not interfere with the free use of the fingers.

The deformity must be overcome even if great force is necessary to put the fragments in normal position. The impaction that is probably often present may prevent a timid surgeon from obtaining the object sought ; but one who understands the injury and the impaired function liable to result if the displaced bone is allowed to remain displaced will not be deterred even if he has to give a general anæsthetic and bend the forearm at its lower end across his knee.

He should grasp the metacarpus of the patient with one hand, the lower part of the forearm with the other. This should be done with the patient's hand in the supine position. The thumb of the surgeon's hand which holds the metacarpus should be placed on the palmar surface of the carpal fragment of the radius as it lies just behind the thenar eminence. Extension and counter-extension are to be made for a moment ; the hand should then be suddenly bent backward in strong dorsal flexion, and at the same instant the surgeon's thumb should push the lower fragment backward into place. This can be done in a moment, and will not require anæsthesia. The reduction will be painful, but is so quickly done that as a rule etherization is unnecessary. If sufficient force is applied, the fragments will be driven into place at once with a coarse grating sensation. Occasionally a repetition of the manipulation may be needed to obtain perfect restoration of the bony contour.

In fractures which have been left unreduced for several weeks more power will be required because the reduction then becomes a refracture. Here it may be necessary to bend the united bone across the surgeon's knee, which is applied to the front of the forearm at the level of the fracture. After the fragments have been broken apart by extension and counter-extension, and a cross-breaking-strain over the knee, applied to the palmar surface so as to tend to increase the displacement, coaptation is to be accomplished by the manipulation just given for the reduction of recent fractures.

As in the ordinary fracture of the base of the radius, immediate and complete reduction is the essential of treatment. If reduction is perfect, there will be little trouble in most cases, and restoration of func-

tion will be prompt and perfect. Stiffness, pain, and other discomforts are due to imperfect reduction, which interferes with the movement of the tendons and probably causes injurious nerve-pressure.

In cases with little or no comminution, and with a transverse line of fracture, a cuff or wristlet of superimposed layers of adhesive plaster three inches wide, extending an inch and a half below and an inch and a half above the wrist-joint, and made sufficiently thick to prevent motion of the wrist, will be all that is necessary in the way of splint.

If the lower fragment is comminuted or easily displaced, because of the obliquity of the fracture-line, or if the patient is a boy liable to engage in boisterous games, a more rigid and elaborate splint may be demanded. Then a circular gypsum-bandage applied from the metacarpo-phalangeal joints to the upper third of the forearm is a perfect splint that exactly fits the irregularities of the patient's limb.

If there is danger of swelling causing either of these two forms of dressing to become too tight, the gypsum-splint or the adhesive plaster one should be split up the middle of the dorsum and held in place by a roller-bandage.

Instead of these dressings, the surgeon can readily construct and apply a dorsal or a palmar splint made of strips of gauze dipped in wet gypsum and moulded to the surface of the hand and forearm. In some cases it may be wise to use both a dorsal and a palmar moulded splint of this kind; but usually either one, if made very rigid, will be sufficient.

A strip of wood six inches long, one inch wide, and an eighth of an inch thick, applied to the dorsal surface of the forearm and metacarpus, makes a good splint for these fractures. The dorsum of this region is straight, and a flat splint can therefore be properly used on the back of the limb.

If the attendant decides to apply a splint to the front of the limb instead of to the back, he must use a moulded splint which will conform to the curve of the palmar surface of the radius. Hence, plastic splints made of gypsum and gauze, or a moulded metal or gutta-percha splint, should be adopted. In all cases the fingers should be unrestrained during the entire period of treatment.

The results in fractures of the lower end of the radius with forward displacement will nearly always be good if reduction is immediate and complete. If the fragment is permitted to remain unreduced, restricted movement, pain, and deformity will persist.

Old cases with unreduced fragments should be treated by refracture, if the deformity or disability is marked. My experience in treating old unreduced fractures with backward displacement leads me to believe that six or more weeks is not too late to attempt remedial refracture. Osteotomy can be adopted if refracture is believed to be difficult. I would probably adopt osteotomy in fractures two or more months old.

Massage, hot fomentations, and electricity will do much good in neglected or previously unrecognized cases in restoring motion and relieving pain.   The benefit derived by these means in Case II. was very great, though not begun until nearly two years after the receipt of injury.

DIAGNOSIS OF DILATATION OF THE STOMACH.

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THE diagnosis of dilatation of the stomach meets wth two difficulties at the very outset : first, the class of cases to which the term is applicable, and, secondly, the difficulty of determining the lesser grades on account of the variability in the size of the normal organ.   It would seem simple enough to decide what class of cases belong properly to this group of diseases ; but practical experience leads us to believe that, though the diagnosis is made with unwarrantable frequency by those who are guided by superficial examination and by clinical symptoms often not at all distinctive, those who have pursued their studies from the modern scientific standpoint, on the other hand, withhold the diagnosis in certain instances in which a careful consideration of the whole subject would warrant the application of the term under discussion.   The group of cases to which the latter observation has special reference is that designated atony of the stomach or motor insufficiency.

All writers, it is true, have recognized forms of dilatation dependent upon atony of the muscular walls of the stomach ; but it has been customary to apply the term atonic dilatation to cases in which the process is well advanced, reserving the names motor insufficiency and simple atony to cases supposed to represent loss of motor function without change of size of the organ.   This view, we believe, is incorrect and founded on too narrow a consideration of the conditions present in the stomach.   There are doubtless cases of chronic interstitial inflammation of the stomach, or perhaps even of ordinary chronic gastritis, in which the organ is not enlarged and yet in which the motor function is diminished, just as there are cases of chronic interstitial myocarditis without cardiac dilatation and in which the heart-power fails ; but the term atony of the stomach is here considered rather as applying to cases of neurotic

or degenerative weakness of the muscle itself, and in such cases we hold there is and must be from the first some, though possibly little, dilatation, just as in cardiac weakness due to obscure disturbances of innervation or to degeneration of the muscle-fibres a certain amount of dilatation must exist. Beginning with a primary disease or atony of the muscle of a hollow viscus there is, of course, a period when no enlargement has occurred; but this period is practically of no duration, for the very first evidence of the disease must, as a matter of course, be due to relaxation —that is, enlargement or dilatation. We hold, therefore, that what is termed atony of the stomach is merely a beginning-stage of actual dilatation, which may or may not progress, and that it should be so classified.

When, however, we approach the second difficulty alluded to, viz., the determination of the existence of dilatation in the anatomical sense by actual demonstrative methods, we at once realize the comparative inutility of all the plans proposed. The matter would be simple enough if it were possible to assign any definite limits to the normal organ or to determine a normal capacity; but both of these are impossible tasks. As far as the normal outline and position of the stomach are concerned, we are quite firm in the belief that Luschka's outlines will be sufficiently represented by the accompanying figure. It will be noted that the pylorus lies in the angle between the right border of the xiphoid cartilage and the right costal margin; that the lower border or greater curvature is well above the umbilicus; and that the fundus lies beneath the base of the left lung and almost completely covered by its projecting margins. There is doubtless considerable movability with the respirations and with increased or decreased amounts of food; but the general points agree very closely with our observations in post-mortem examinations; and the latter, we may assert from our own experience in cases studied during life and post mortem and from the recent investigations of Meinert, furnish reliable indications of the position of the organ during life. We cannot, therefore, agree with those (Martius, Meltzing, and others) who assert that the normal position of the inferior margin of the stomach is as low as the umbilicus or lower. Such views, we are convinced, are based upon either unreliable methods or upon the study of cases of downward dislocation of the pylorus or the abnormal vertical position of Kussmaul. In these latter cases the stomach is not of necessity enlarged, though this may frequently be the case; but in any event it is to be noted that when the lower margin of the organ lies near the umbilicus or below it, and is due, in the main, to dislocation, a corresponding dislocation of the pylorus and of the lesser curvature may be expected. When, on the other hand, there is actual dilatation of the stomach the lower margin is similarly placed, but the lesser curvature and pylorus are then much less displaced. Some dislocation does occur in nearly all cases of dilatation excepting such as are complicated with

adhesion to the liver and other structures; but the downward displace-
ment of the lower curvature is far in excess of that of the lesser curva-
ture and pylorus in cases in which the dilatation is the principal or pri-
mary condition and the dislocation merely subsidiary or secondary.   To
this extent the study of the normal position of the stomach is, in our
estimation, of value, and the recognition of the vertical position as an
abnormal one of importance.

FIG. 1.
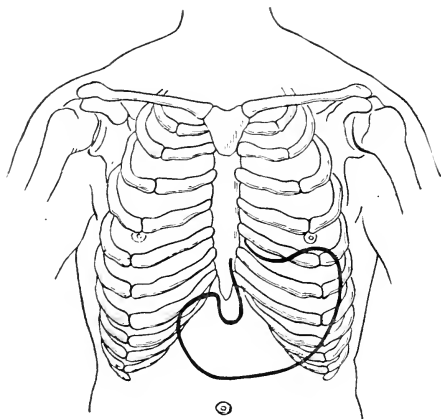
Normal position of the stomach.   (After LUSCHKA.)

The second point concerning the anatomy of the organ to which we
have alluded as offering difficulties in the recognition of dilatation is
the size of the organ.   That this varies greatly in different individuals
would seem to require no special demonstration, but studies have been
recorded which indicate how great a variability exists within the limits
of what may be termed normal structure.   In the casts made under the
direction of v. Ziemssen it was found that the difference in shape, as
well as size, of the stomach was very considerable in persons of about
the same size; and Pacanowski found great variations in the area of
gastric tympany in eighty-one cases.   In Ziemssen's series the capacity
of the organ was determined by filling specimens with water, and was
found to fluctuate markedly; the greatest capacity, however, being 1680
c.cm.   We have ourselves made studies in the same direction, taking cases
in which no suspicion existed of gastric disease.   The stomach in each
case was filled with water under a pressure of about 25 cm. (part of the
œsophagus being left attached).   The smallest organ was found in a boy

of nineteen years, 1.73 m. in height, who had died of pulmonary phthisis. The stomach in this case held but 500 c.cm. of water. The largest stomach was found in a woman of twenty-nine years, of rather delicate construction, and 1.55 m. in height. In this case the stomach held 2600 c.cm. In other cases the capacity varied greatly between these limits, that of a number being over 1680 c.cm.—Ziemssen's maximum. It may further be observed that Beneke's figures also indicate a far greater capacity than do those of Ziemssen; but, after all, it is evident that the variability in the size of the stomach is too great to permit of absolute limits even for the maximum size of what might be considered a healthy organ.

The mere question of size has, therefore, lost much of its old-time significance as an indication of dilatation, and Ewald, Riegel, and others very properly call attention to the fact that all of the physical signs of enlargement of the stomach may be present without any evidence that there is functional insufficiency. To this condition Ewald has given the name megastria or megalogastria. Enlargement of the organ of such degree that it may be clearly spoken of as in excess of the maximum size found in ordinary healthy individuals cannot at once be termed dilatation. There must always be evidences that the motor power is deficient and that stagnation of food is taking place. It is going a step too far, however, to dispose entirely, as Boas does, of the term dilatation, and to classify all cases under the heading: Gastric Insufficiency, of the first or the second degree. Dilatation is a pathological entity not to be set aside in this manner, and though we agree with Boas in the important part he assigns to the want of motor power, we cannot agree that the latter should be made the basis of classification. There are undoubtedly cases of actual and sometimes considerable dilatation of the stomach in which the motor power has been augmented almost or quite to the point of restoration of sufficiency at first impaired by pyloric obstruction. A classification based entirely upon the study of the motor function would fail to include such cases among the pathological conditions of the organ, though in but a short time rupture of the compensation might occur, and the cases might at once fall into the category of insufficiency of the second degree, or of great gastric dilatation. Boas's classification owes its origin, we believe, to a recognition of the difficulty of determining whether the size of the organ has become augmented or not; but this is a difficulty that must be overcome, and not evaded.

From these preliminary remarks we may conclude that the term dilatation of the stomach is to be applied to a greater number of cases than has usually been admitted, and that in particular the condition known as simple atony or motor insufficiency is really an early stage of dilatation; that the mere determination of the size of the organ is not to be

considered a reliable indication of dilatation, though, on the other hand, the importance of enlargement must not be overlooked.

We would classify all cases in two groups, designating these as *atonic dilatation* and *obstructive dilatation*, respectively. We would reject the term mechanical dilatation, since certain cases of dilatation are essentially mechanical, in that they result from traction upon the walls of the organ, and yet are not mechanical in the sense in which this term is ordinarily applied, viz., as indicating pyloric obstruction. It is not our purpose to speak exhaustively of the causes of dilatation of the stomach, but we wish rather to review briefly the principal conditions giving rise to this disease.

Atonic dilatation may occur in two ways; first, by primary or absolute atony of the walls; and, secondly, by secondary or relative weakness. Primary atony of the walls with atonic dilatation of slight degree is a much more frequent condition than has been generally believed. It may occur in persons of relaxed fibre, in nervous, anæmic, or debilitated conditions, resulting from a variety of causes; or, on the other hand, it may be a complication of chronic or even of acute gastritis. In rare cases, as in those of Fagge, Endmann, Oser, Kundrat, and Boas, atonic dilatation may be acute, and in such instances it is prone to be serious. Some of these cases, however, are doubtless obstructive, the pyloric stenosis being due to spasm, the result of acute indigestion or hyperacid secretion. Usually it is a slowly progressive or a stationary process, largely influenced by the general conditions of the patient's system.

In the group of atonic dilatation due to relative atony of the walls may be included the cases in which overeating and drinking are responsible for the disease. In such cases the constant strain of large amounts of food gradually induces relaxation and enlargement; and it is likely, also, that hypersecretion and hyperacidity are first set up, and that these are largely the cause of the subsequent dilatation, being active in the way of causing pyloric spasm, or even hypertrophic thickening of the pyloric ring. Another form of relative atony of the walls of the stomach is that produced by adhesions or by the dragging of the omentum in corpulent persons. In such cases the natural tone of the stomach-walls is overcome and more or less relaxation ensues. Somewhat similar conditions are present in cases in which cicatrices of gastric ulcers occupy parts of the stomach removed from the pylorus. There results a weakening of the walls of the organ which terminates in dilatation.

The group of obstructive dilatation of the stomach comprises the cases dependent upon pyloric stenosis, whether this be organic or functional, and due to disease of the pylorus itself or to outside causes. It is scarcely necessary to make more than passing mention of the causes of organic pyloric obstruction. Carcinoma and cicatrices of pyloric ulcers are the important forms of stenosis; but occasionally other neoplasms

or hypertrophy of the pyloric fibrous or muscular tissues may be active. Among the rarer neoplasms causing obstruction we have seen a myoma of the muscularis which projected into the stomach and acted like a ball-valve, very much as, in certain rare cases reported in the literature, peach-stones or other foreign bodies have acted. In another case under our observation the stenosis was caused by infiltrating sarcoma. A number of times we have seen the pylorus occupied by a ring of fibro-muscular tissue somewhat resembling, in its microscopic appearances, a scirrhous cancer. In such cases there has generally been a history of painful disorder of digestion and of constant hyperacidity, and we have no doubt that frequently repeated spasms, probably combined with inflammatory attacks, account for the formation of such hypertrophic conditions. Among the cases of so-called annular myoma of the pylorus, many, no doubt, belong to the cases here referred to. Repeated spasm may, however, result in dilatation without notable organic change at the pylorus. The antecedent causes which occasion spasm may be various. Hyperacidity and hypersecretion, and these in turn often dependent upon overeating and alcoholic excess, have been referred to. Acute and painful ulcers near the pylorus may act in a similar manner, and possibly displacement of the kidney or other abdominal diseases may give rise to reflex pyloric contraction.

Dislocation of the stomach, and especially the extreme vertical position, may cause a mechanical obstacle to the discharge of the gastric contents from the position alone, and a more serious obstruction in the form of a sharp angulation of the horizontal portion of the duodenum, or of the junction between the stomach and duodenum.

The causes of pyloric obstruction outside the stomach itself are very numerous. Tumors may compress the pylorus, or, as in one of our cases, inflammatory adhesions may bind it firmly to the head of the pancreas and the posterior abdominal wall. Some attention has been called to displacement of the right kidney as a cause of dilatation by Bartels, Malbranc, Schütz, Litten, and others, and one of the cases here reported by us belongs in the same class. We do not feel warranted in asserting that the gastrectasis in such cases results entirely from pressure upon the duodenum; nor, on the other hand, does it seem likely that the conditions are wholly coincidental. A consideration of the anatomical relations permits the suspicion that injurious pressure upon the duodenum might result from moderate displacement of the right kidney, especially if such displacement were due to downward and inward pressure of the liver, resulting from tight lacing. Some authors have urged that the very movability argues the unlikelihood of serious pressure occurring in this way; but with a moderately movable kidney the conditions are just such, we would urge, that so long as the thoracic compression is continued the kidney is forced against the vertical portion of the duode-

num. It has further been claimed that the peristaltic movements of the intestines are so active that the pressure of the kidney could scarcely cause obstruction. To this we would reply that the portion of the duodenum pressed upon by a displaced kidney is one of the least movable parts of the entire tract, being quite firmly attached by the reflection of the peritoneum lying in front of it. While for these reasons we are still disposed to believe that displacement of the kidney may occasion gastrectasis by direct pressure upon the duodenum, we are also inclined to believe that other causes act at the same time. Thus simultaneous gastric and visceral descent may cause angulation and compression of the duodenum, while reflex nervous spasm of the pylorus or neurotic relaxation of the entire organ may be the principal or the contributing causes in some cases.

DIAGNOSIS. The ultimate diagnosis of dilatation of the stomach must rest upon the recognition of deficiency in the power of the stomach to propel its contents into the intestine and upon the discovery of enlargement of the organ; but there are numerous features presented in the disease of a more or less significant character, which are discovered in a systematic examination by the methods of physical investigation. In very many cases the existence of the disease may be suspected from some of these general manifestations without minute or special examination of the stomach, and it is important to recognize these general features, especially in cases in which the degree of enlargement is such that doubt may arise as to the real existence of dilatation, or in which the motor function cannot be properly estimated or is not greatly disturbed.

We take up the diagnostic features of the disease in the usual order of physical examinations.

Inspection. The patient usually presents more or less characteristic general appearances. He is emaciated, often cadaverous, in appearance; the skin is dry and harsh and may be unnaturally wrinkled; after a time the epidermis becomes thickened and may form hardened scales upon the surface. The cutaneous circulation, particularly in the extremities, is sluggish, and coldness and blueness of the hands and feet are commonly observed. The patient's expression is apathetic and the facies are characterized by a peculiar haggardness.

The abdominal examination frequently reveals abnormal distention. This may be seen in the left hypochondriac or the umbilical region; but more frequently the upper part of the abdomen is hollow and depressed in a transverse furrow, while the hypogastric region is greatly distended. In advanced cases the hollowness of the epigastric region in contrast with the lower portions of the belly is a striking and significant fact. Not rarely peristaltic waves may be seen passing from left to right over the distended stomach, and occasionally reversed peristalsis or antiperistalsis may traverse the swelling from right to left. The veins of the

lower portion of the abdomen, particularly those passing upward over the iliac fossæ, are habitually enlarged and prominent.

Palpation. In cases in which the abdominal walls are lax it may be possible to feel the lower margin of the greater curvature throughout a considerable portion of its extent through the abdominal walls; and when the organ contains a certain amount of water it may be possible to produce a succussion-splash palpable to the examining-hand. More commonly no definite outline is palpable, but the peristaltic waves before referred to may be felt passing to and fro. Palpation is frequently of service in differential diagnosis in determining the existence of pyloric thickening or new growths.

Auscultation. Auscultation over the stomach frequently demonstrates signs indicative of the passage of liquid from the œsophagus into the stomach. The significance of these sounds, however, remains more or less doubtful, and they are of no practical service in the diagnosis of dilatation. Of some importance are the succussion-sounds heard when the stomach contains a certain amount of liquid and air. In themselves these sounds are of no special significance, since they are discovered in stomachs presumably healthy. When, however, they occur at times at which the stomach should normally be entirely free from liquid contents, their significance at once becomes apparent in indicating loss of motor function and abnormal retention of the gastric contents. These succussion-sounds vary very greatly in intensity, and certainly in the normal stomach never become distinct enough to be plainly audible at a distance, while in gastric dilatation we have repeatedly found them so distinct that they could be demonstrated to students standing about. Besides the succussion-splash another auscultatory phenomenon deserves mention, namely, the loud gurgling or rumbling sounds occasionally heard. Patients are frequently able to develop these when standing upright, and their significance is open to considerable question. For ourselves we have always felt that the existence of these sounds was indicative of gastric or intestinal relaxation, though it must be confessed that they are heard in cases in which dilatation could scarcely be supposed to exist.

The splashing-sounds referred to before may easily be simulated by sounds originating in the transverse colon or in other parts of the intestine and resulting from the presence of gas and liquid within the viscera. In cases of doubt, therefore, the colon should be carefully freed from its contents before the test is applied.

Of late, the attempt has been made to determine the existence of atony or of dilatation of the stomach by the amount of liquid necessary to produce splashing-sounds. This test, however, in common with others which we shall have occasion to allude to, lacks precision and significance, principally because of the varying capacity of the stomach in

different individuals, and because of the danger of mistaking dislocation of the organ for dilatation.

We shall refer again to auscultation in connection with percussion in describing the method of auscultatory percussion.

Percussion. The determination of the outline of the stomach by percussion is open to a number of fallacies, and deductions cannot properly be drawn on account of the varying anatomical conditions. Neither the relations of the various borders of the stomach to the different bony points of the thorax nor the actual measure of gastric tympany obtained in transverse, vertical, or other directions are reliable on account of the differences in structure and contour of the thorax in different persons, on the one hand, and on account of the very wide variation in the size of the stomach in presumably healthy individuals, on the other hand. In so far as the value of percussion itself is concerned, it must be recognized that the amount of distention, the quantity of material contained within the stomach, and the condition and position of adjacent viscera must largely influence the results. In particular, the position of the lower border is difficult to determine from the fact that the tympany obtained over the transverse colon may so closely resemble that obtained over the stomach that an accurate separation of the two is impossible. In the second place, not rarely the colon overrides the stomach and thus makes the determination of the lower border of gastric tympany impracticable. When the left lobe of the liver is enlarged or unnaturally prominent in the epigastrium it is difficult or impossible to determine the exact outlines of the stomach even though it be quite well distended. To a certain extent percussion may be rendered more precise and valuable by cleansing the colon carefully, and by repeating the percussion in different positions; but despite these precautions no reliable deductions can be drawn.

Other Methods of Determining the Size and Capacity of the Stomach. Perhaps the oldest method devised for this purpose is that of Leube, of introducing a stiff sound and palpating the end through the abdominal walls. The dangers and unreliability of this method have, however, led its originator himself to abandon it, and the method is no longer practised anywhere.

A variety of methods have been introduced which, for the most part, depend upon the amount of liquid that may be introduced into the organ. These, however, are all subject to objections of a serious character. The tolerance of the patient varies so greatly that one will complain of pain when the stomach is scarcely at all distended, while another will bear the greatest possible amount to be introduced. This objection alone would suffice to make these methods unreliable were there not the greater difficulty—that stomachs vary widely in their capacity in different individuals of the same age, size, etc. We therefore place no reliance at all

on these methods excepting so far as it may be assumed with tolerable certainty that a stomach which will accommodate 2.5 or 3 litres is probably larger than normal. The usual standard that has been adopted is 1700 c.cm.; but this is certainly too small to warrant positive deductions. In another group of methods the attempt is made to localize the lower border of the organ, and of these that which has attracted most attention is the method of Dehio. This observer, it will be recalled, determines the lower border by introducing measured quantities of water into the stomach and determining the lower border by percussion, the patient standing erect. He has determined that the lower border will be found 11.5 cm. below the end of the sternum after the introduction of one-quarter litre of water, and that the border descends between 2 and 3 cm. with each additional quarter litre introduced; but that in the normal individual the lower border never descends below the umbilicus. With this last conclusion we are quite ready to agree, though we cannot regard the method free from objections or its results valuable in the diagnosis of dilatation. Our own studies with other methods lead us to entirely the same conclusions regarding the lower border, viz., that it always lies above the umbilicus. When, however, it is found below the umbilicus the conclusion is by no means warranted that the stomach is dilated. The same thing will be found in dislocated stomachs, and this condition, we are convinced, is one of great frequency. The method itself is open to some objections which impair its reliability; but, on the whole, it is useful for the determination of the lower border of the organ. The great weakness of Dehio's plan, or rather the great error of many of those who have used it, is the interpretation that has been placed upon the results. We still employ the method and find it satisfactory; but in all cases we seek to control the result by auscultatory percussion and by inflation, and in particular to determine the position of the lesser curvature and of the pylorus. If, then, by Dehio's method we find the lower border of the organ below the umbilicus and the pylorus and lesser curvature similarly depressed, we conclude that dislocation or vertical position is the cause of the depression of the lower border rather than dilatation.

Finally, we would add a few words regarding the method of illumination. This, we must confess, has not from the first appealed to us as a practical method, though in hospital practice it seemed to offer the hope of accurate and useful results. Our own experience is very limited and not very encouraging; and if the results of Martius and Meltzing indicate the conclusions as to the normal situation of the stomach, and are to be attributed to the method, and not to their having investigated cases of gastroptosis, we are disposed to believe that gastro-diaphanoscopy will not prove a reliable guide. Certainly the method of inflation, which can scarcely give erroneous results when it is at all suc-

cessfully practised, and the experience of post-mortem examination do not warrant the belief that the stomach normally occupies a position so far down in the abdomen as Martius and Meltzing have found.   It seems likely to us that the light radiates through adjacent coils of intestine and thus gives rise to false impressions.

There remain two methods of examination, the value of which we have tested in many cases and of which we feel fully convinced.

Auscultatory Percussion.   For some time past we have practised this method in view of the unreliability of simple percussion.   Auscultatory percussion, though by no means an original or novel method of examination, has not, we believe, received the attention it deserves, nor has its reliability been sufficiently investigated.   In our own experience with this method, not only in the examination of the stomach, but also of the heart, the liver, and other solid viscera, we have become convinced that its results are far more accurate than those of ordinary percussion, and that, so far as the stomach is concerned, it may be depended upon to furnish a reliable indication of the position, and, to a certain extent, of the size of the organ under the conditions present at the time of the examination.   Of course, it is open to some of the objections which may be urged against ordinary percussion, namely, that the distended colon may cover over the inferior border of the stomach, and that the results must vary according to the degree of distention of the stomach itself. It is not, however, liable to the error that the left lobe of the liver may obscure the gastric tympany, as the note is readily transmitted through this to the stethoscope.   In applying the method to the examination of the stomach we use a double stethoscope with long rubber conductors, so that while the patient supports the bell first near the position of the fundus, then below and toward the body or pyloric end, the observer is able without discomfort to perform the percussion, approaching the stomach gradually from all points.   Next, the percussion is reversed, the finger or pleximeter being placed over the stomach itself and near the bell of the stethoscope ; then gradually carried outward toward the periphery until the limits of the organ are passed.

In this manner it is extremely easy to determine the exact limits as far as the method permits of accuracy, and we have repeatedly found that several persons practising auscultatory percussion at the same time have obtained limits which did not vary above $\frac{1}{2}$ or 1 cm.   Furthermore, in cases in which we have practised this method and in which subsequently inflation with atmospheric air was used, or in which the accuracy of the determination was controlled by post-mortem examination, we have found that the outlines of the stomach, as determined by the auscultatory percussion, have been extremely reliable.   In normal individuals the positions of the fundus, of the lesser curvature, of the lower border, and of the pylorus, have generally corresponded with the outlines given by

Luschka; while in cases of dilatation and in cases of gastroptosis wide variations from the normal position or size have been readily demonstrated.

Inflation. Far more useful, however, than any of the methods thus far described is that of inflation. A number of methods have been proposed, the best known of which is that performed by administering sodium bicarbonate followed by tartaric acid. Our experience with this method is comparatively limited, as the objections which have been urged against it, and which have occurred to us, have made us hesitate to employ it, except in occasional instances; and, further, because we have found the method of inflation with atmospheric air entirely satisfactory. The administration of effervescing mixtures seems to us objectionable from the facts that the distention is entirely uncontrollable, and that in cases of ulceration or other disease of the stomach dangerous results might follow. Thus we have known of cases in which considerable irritation was produced, and others have been reported in which actual hemorrhage was caused. The method is unreliable also in that at times the amount of gas generated falls short of that necessary for distention of the stomach. Still further, it may be objected that sudden and intense distention may give rise to serious pressure or reflex disturbances, though no actual cases proving this suspicion are known to us. On the other hand, the method of inflation with atmospheric air has the one objection, that it necessitates the passage of a stomach-tube; but this is certainly an objection of little importance. There are, of course, certain cases in neurotic or oversensitive individuals in which the passage of a tube may be objectionable; but where the necessity of making an accurate diagnosis of a possibly serious gastric disease arises, objection to the passage of a stomach-tube is certainly scarcely worth consideration, and, as accurate diagnosis will require the passage of the tube for other purposes, it is not likely that this objection will interfere with the application of the method. For the purpose of inflation we employ a simple bulb, such as that used in the ordinary Davidson syringe, and begin the inflation by vigorous and rapid compressions, so that the amount of air projected into the stomach at the beginning may be as considerable as possible. In this way it has seemed to us that the pylorus is at once placed in a condition of spasm or contraction, and that thus the escape of the air into the intestine is prevented. The latter accident, however, does sometimes occur in cases of relaxation of the pylorus; but more frequently some of the air tends to escape along the œsophageal tube. The stomach is soon filled and becomes plainly visible through the abdominal walls, so that its size, its outline, its position, and, most important of all, the position of the upper curvature, the pylorus, and the inferior border, are readily made out. We have employed this method in numbers of cases of gastric dilatation and other conditions,

and have come to regard it as the only satisfactory means of determining the size and position of the stomach.

We proceed now to the second point of importance in the diagnosis of gastric dilatation : to the determination of the motor activity or sufficiency of the walls of the stomach. Here, too, we find a number of methods recommended. Among the older of these is the salol-test, to determine the duration necessary for propulsion of the contents into the duodenum, the assumption being made that the decomposition of the salol speedily follows its entrance into the alkaline intestinal secretions. According to Ewald, this takes place and the resulting salicylic acid appears in the urine within forty to sixty minutes, in health, and not until a much later period in gastrectasis. It is unnecessary to enter upon the discussion of the merits of this test. Numerous observers have found and our own experiences have taught us that Ewald's method possesses no practical usefulness.

Another plan proposed was that of introducing a measured quantity of oil into the stomach and removing the portion remaining after two hours with the stomach-tube. This method has the great disadvantage that complete removal of liquids from the stomach is often impossible, and that the limits of normal motor activity probably vary more widely than such a test would permit us to believe.

The most reliable method of direct determination of motor insufficiency is that of v. Leube. According to this observer, all traces of a meal of meat, soup, and bread disappear from the stomach in the course of seven hours when the motor activity is normal. When atony is present food-remnants may be found at much longer intervals after the meal ; and even on the morning of the next day when the test-dinner was given in the evening. This method is easily practised, and, in view of the wide variations which doubtless exist in different individuals, is as accurate as we may expect.

The elaborate methods of measuring and recording motor activity with the aid of instruments, acted upon by columns of water or air compressed in bulbs or other contrivances introduced into the stomach, are cumbersome, impracticable, and therefore useless. It is, therefore, unnecessary to consider their sources of error.

Dehio has claimed that his method of determining the lower border of the stomach by introducing measured quantities of water is useful also for the estimation of motor activity. He has found that in cases of atony the lower border of the stomach descends to the umbilicus with the addition of only moderate quantities of liquid, while the border in dilatation is found below the umbilicus even after the introduction of the first quantity. From such differences in different cases he would determine the less or greater motor power. This assumption, however, seems to us an unwarranted one, and we agree with Riegel in his assertion that greater

elasticity does not of necessity imply less motor power ; but entirely aside from this point, the method of Dehio is fallacious, in that it does not take into consideration movability of the stomach apart from dilatability. In addition to these methods of determining the motor power directly, there are certain examinations, particularly the chemical investigation of the gastric contents, which furnish evidence of the decay of food in the stomach. The most striking and obvious feature is the decomposition which leads to sour and ill-smelling vomita. To a certain extent this is a measure of the motor insufficiency, as is also the presence or absence of sarcinæ, yeast-fungi, and other organisms of fermentation and putrefaction. In cases of extreme delay of the contents of the stomach decomposition of the starchy and saccharine foods may lead to the fermentation of lactic, acetic, butyric, or other fatty acids, while putrefactive changes of proteids lead to ill-smelling gases containing sulphuretted hydrogen in particular. The existence of these substances in vomited matters, or in the stomach-contents removed with the tube, is always indicative of undue retention of the food. The amount and kind of decomposition that prevails depend to a large extent upon the kind of food taken and the character of the gastric secretion, especially upon the presence or absence of free hydrochloric acid. Boas has recently maintained that the presence of lactic acid in the stomach-contents after a test-meal containing no lactic acid is specially significant of carcinoma. This point is in a measure established, though it has not the pathognomonic importance Boas sought to give it. Lactic acid is occasionally found in non-malignant cases, as in one of our present series. On the other hand, repeated examination may fail to show it in cases of carcinoma, as we have found. We need not enter more fully upon this controversy now. Suffice it to say that lactic acid when present is an indication of stagnation.

The amount of urine is another indirect evidence of motor insufficiency. Von Mering's investigations and the subsequent clinical observations of many others have shown that the mucous membrane of the stomach plays little part in absorption, either of liquid or of other matters. In consequence, obstruction of the pylorus and vomiting lead to rapid desiccation of the tissues and to decrease in the quantity of the urine. This decrease, however, is largely dependent upon associated conditions, and may fluctuate considerably, so that the exact quantity is of little value in diagnosis or in determining the degree or progress of the disease.

We have thus sketched the principal methods of investigation and points in the symptomatology which are of value in the determination of gastric dilatation. Of necessity allusion has been made to certain methods which we do not ourselves employ, and of whose value and reliability there may be much question. The methods upon which we rely are those of auscultatory percussion and inflation, and upon Dehio's

method for determining the lower border of the organ. The mere determination of one or another of the borders of the stomach is of little value; but taken in connection with the other portions as determined by the same or supplementary methods of investigation, and with the discovery of deficient motor activity, the diagnosis can generally be made with ease. Mistaken diagnoses are more often the result of insufficient examination than of unreliability of methods at hand.

DIFFERENTIAL DIAGNOSIS. The points upon which this will rest have been more or less thoroughly considered; but it seems advisable to point out certain contrasted conditions with the indications pointing to one or the other, and to consider somewhat the methods by which an opinion may be formed as to the original cause.

Megalogastria and Gastrectasia. Ewald, Riegel, and others have described cases of enlargement of the stomach without symptoms of functional disturbance. Such cases are doubtless instances of physiological or natural largeness of the stomach, and may properly be designated as megastria or megalogastria. What we have before said regarding the variation in the size of the stomach in different persons need not be repeated, but it is clear that no definite limits can be assigned to what may be considered a normal stomach. How large a stomach may be without danger of stagnation of food on account of the mere capaciousness is difficult to say, and cases of enlargement sufficient to be certainly recognized by clinical methods, and in which no symptoms of dilatation are found, are comparatively rare. The diagnosis is simple enough, and depends altogether upon the fact that no sign of stagnation of food or of serious disturbance of digestion can be discovered. The only difficulty offered is to distinguish cases of obstructive enlargement with compensatory hypertrophy of the walls of the stomach. In the latter, however, there is always a history of gastric disease running backward for varying periods; and usually, if not always, the compensation is only partial, some deficiency of motor activity being present. The general appearance of the patient also gives important indications, and in cases of non-malignant pyloric stenosis there is usually excessive acidity of the gastric secretion, and subjective symptoms more or less severe.

Gastroptosis and Gastrectasia. Displacement of the stomach—the vertical position of Kussmaul or gastroptosis of Glenard—has long been recognized; but its frequency has been underestimated, and without doubt it has often been mistaken for gastrectasia. A consideration of the anatomy and relations of the stomach is convincing of the fact that displacement must affect the pyloric end almost entirely, while the cardiac end and fundus are more or less normally situated. The result of displacement, therefore, is a vertical position such as occurs in the newborn. In normal individuals, after early infancy, the position of Luschka is assumed and retained; but very often, as a result of the pressure of

clothing about the waist or of other causes, displacement occurs and causes the pyloric end to fall to lower levels than normal. The frequency of such pathological position is probably greater than has been generally believed, and in our experience with inflation of the stomach we have found it surprisingly frequent.

In gastrectasia the pylorus usually also descends somewhat, though rarely so much as in gastroptosis. When studied in relation with the lower border the position of the pylorus is found relatively little displaced. Dilatation habitually affects the greater curvature near the pyloric end more than other parts,[1] and in consequence the distance between the pylorus and the lower border becomes excessive. This is well seen in some of our diagrams (Figs. 2, 3, and 4) as well as in illustrations given by various authors.

These considerations show the value and necessity of determining the position of the pylorus and lesser curvature as well as that of the lower border, and the unreliability of basing deductions upon Dehio's method alone. If the pylorus is not much displaced and the lower border is below the umbilicus, dilatation probably exists; but if the pylorus is near the umbilicus, the low position of the lower border loses its significance. In certain cases of gastroptosis a moderate amount of associated dilatation may exist. In such cases the diagnosis, as far as the mere estimation of size is concerned, depends upon our judgment as to whether the descent of the lower border is out of proportion to that of the pylorus and lesser curvature or not. The absolute diagnosis, however, in such cases depends upon the determination of the motor activity of the walls.

Obstructive and Atonic Gastrectasia. The differential diagnosis between these conditions may be extremely difficult in some cases, particularly when the early history is wanting. Where a distinct neoplasm is discoverable the diagnosis becomes a simple one; but in the absence of this it must depend upon a consideration of the course of the disease, and to a certain extent upon the degree. Very rarely does atonic dilatation reach the enormous grades sometimes witnessed in obstructive gastrectasia. In addition, it will be found that the course of the case is less regular and progressive. Not rarely there will be a history of early remissions and accessions in the disturbances, and when the patient is continuously under observation marked variations may be noted from time to time. Physical examination is less apt to discover peristaltic waves, and the chemical examination shows no such marked excess of HCl as is seen in many cases of non-malignant stenosis. It must be admitted, however, that some cases of dilatation beginning with hyper-

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[1] Certain investigators have found that the portions of the stomach near the pylorus are especially active in expelling the contents. It is clear, therefore, that those parts would suffer most distention in cases of obstructive dilatation. In any event, however, the most dependent part of the organ would be prone to dilate.

acidity and hypersecretion are atonic rather than obstructive. Obstructive dilatation differs in its course mainly in that it is progressive and persistent. The earlier stages, during which compensation is maintained, may be marked by few symptoms; but after compensation fails, and often this occurs quite as abruptly as failure of compensation in cardiac disease, the disease is lasting and quite regular in its downward course. The dilatation in this stage often reaches proportions never attained in atonic cases.

Malignant and Non-malignant Obstructive Gastrectasia. The general appearance of the patient gives us less information than we might expect. Not rarely, as has been noted, the patient assumes a cadaverous, cachectic appearance in entirely non-malignant dilatation; while, on the other hand, instances may be found of cancerous obstruction in which the general appearance of the patient is quite good. The investigation by physical examination, and particularly the chemical examination, may furnish important diagnostic factors. The most significant fact is the discovery of excess of HCl in certain non-malignant cases. The mere presence of hydrochloric acid, even in cases of excessive obstruction with dilatation, does not exclude carcinoma, as we have several times found; but excessive hydrochloric acid does not seem ever to occur in such cases.

The presence or absence of lactic acid has been urged by Boas as a fact of diagnostic value. This, however, requires further confirmation. Boas himself admits the occasional presence of small quantities in non-malignant dilatation, and one of our present series of cases showed the same. On the other hand, lactic acid may be absent in cases of cancer, as we have also found. On the whole, however, it seems fairly well established that the occurrence of lactic acid (when sought after according to Boas's method) is a point of considerable value as indicating carcinoma. Further, it has been held by Boas that albuminous decomposition with production of sulphuretted hydrogen occurs in benign rather than in malignant cases; but we have found it present in both forms.

The discovery of a palpable tumor in the pyloric region is the most suggestive fact of all, and usually serves to establish a positive diagnosis. At the same time it must be remembered that hypertrophic thickening of the pylorus may simulate carcinomatous tumors, and that enlarged lymphatic glands and even the head of the pancreas may be felt and mistaken for carcinoma. Recently examination of the blood has been suggested as a means of making a differential diagnosis, the studies of R. Müller and Schneyer showing that digestive leukocytosis is wanting in carcinomatous stenosis but normal in other cases. Finally, the rapid progress of the case, occurring in a person beyond the age of forty, and without a history of prolonged gastric troubles, adds to the probability of the cancerous nature of the obstruction.

CASE I. *Obstructive dilatation; non-malignant stenosis of the pylorus.*—C. M., aged thirty-five years, a laborer, was admitted to the hospital December 7, 1895. His father had died at the age of forty-five years, the cause not known. His mother and four sisters are living and in good health. One sister died of pneumonia. Nothing in his family history bears on his present case.

He himself was a healthy lad until about his twentieth year, when he had a vague attack of malarial fever and was confined to bed for three weeks. In 1883 he was injured in a coal-mine, and in 1884 was again injured. In 1890, while working in an iron-mill, he was overheated and afterward chilled. This led to an illness which was called hepatitis and which confined him to bed for fifteen weeks. There were chilliness, vomiting, and a great deal of pain, the latter referred to a point on the right side between the anterior superior spine of the ilium and the umbilicus. The patient has always been a temperate man with regard to the use of alcoholics and chewed tobacco only moderately. He was careful in his manner of eating, generally taking his food regularly and chewing it well.

The illness which brought him to the hospital was gradual in onset and had been increasing during the past two years. He first noticed eructations of gas and then began to suffer with a heavy feeling in the stomach, relieved by vomiting. The latter did not begin until some time after the first symptoms, but became constant after their onset.

Physical examination. When the patient presented himself he was considerably emaciated, the malar bones standing out prominently. His voice was rather hoarse, his skin dry and scaly, and in general there was a desiccated appearance. On examination, it was found that the upper part of the abdomen (epigastrium) was rather hollow, while the lower part (below the umbilicus) was greatly enlarged. The superficial veins, especially those on the lower and lateral portions of the abdomen, were much enlarged. The size of the stomach was determined by auscultatory percussion and found to be unusually large. Splashing-sounds were evident when the fingers were pressed against the abdominal wall as well as on shaking the patient. The contents were removed with the stomach-tube and were found to consist of 2500 c.cm. of horribly offensive decomposed material. Chemical analysis of this showed a total acidity of 67, with a considerable proportion of free HCl (40 by Braun's method for free and combined HCl), and lactic acid in considerable quantity (Uffelmann's test).

The patient's blood was examined, showing 3,863,000 red corpuscles and 9300 white corpuscles. The urine showed as follows: volume for twenty-four hours, 1718 c.cm.; turbid and yellowish; reaction slightly alkaline; specific gravity 1020; no albumin; no sugar; P_2O_5, 3.126 g. (0.182 per cent.).

The patient was ordered lavage and a graduated albuminous diet, with a restriction of liquids, electrical stimulation, and colonic douches. Under this treatment his general condition improved somewhat, though the condition of the stomach remained about the same.

It was constantly found that the food of the previous day could be removed from the stomach in the morning, and sometimes portions of food from several days previous were thus obtained. There was constantly excessive acidity, and free hydrochloric acid was invariably found present, the quantity ranging from 30 to 56. Lactic acid was occasionally present to Uffelmann's test, but was never detected by Boas's method, though repeatedly sought for.

The size of the organ was evidently greatly in excess of the normal, and in practising lavage it was found that from 2½ to 3 litres caused no particular discomfort. Auscultatory percussion found that the organ extended from its usual position beneath the left lung and heart downward as far as the umbilicus and even further, and that the pylorus, though somewhat depressed, was separated from the lower border by a considerable space. Inflation with air gave a similar result, and the organ was readily demonstrable to a class of students in an amphitheatre.

The patient's general condition improved somewhat, but he continued to have burning pain, heaviness, disturbances of sleep, and attacks of vomiting.

It was finally decided to operate. Dr. J. William White was called in and performed the operation of divulsion, finding the obstruction at the pylorus
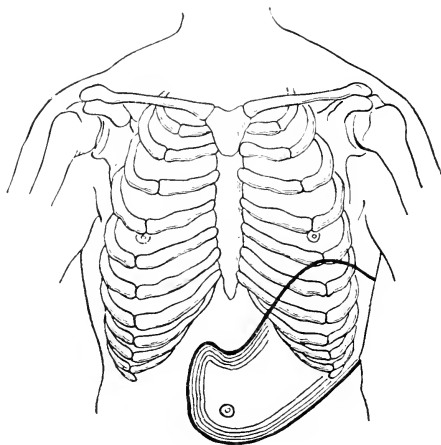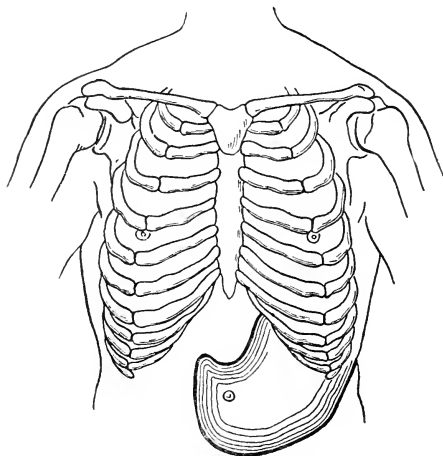
FIG. 2.

FIG. 3.

due to a circular ring of dense sclerotic tissue, which at first sight presented the appearances and feeling of a carcinoma.

The subsequent history of the case was eminently satisfactory, the recovery from the operation being prompt and the restoration of the stomach to its normal functions almost complete.

Lavage has been practised on two mornings and no food-remnants of the previous day obtained. A Boas's test-meal was found to have passed into the intestine after two hours.

CASE II. *Obstructive dilatation; carcinoma of the pylorus.*—C. L. P. was seen with Dr. Lee H. Smith, of Buffalo. The patient, a banker, aged fifty-four years, was treated twice in 1887, being operated upon for stricture of the urethra the latter time. A cure of this disease was effected, and there does not appear to have been any recurrence of the trouble. His general health since then continued to be very good until September, 1895, when he noted obstinate constipation—not relieved by usual exercise and diet. He never had any severe illness which confined him to his bed, but has always been bilious at times. Within two months of his death he began to lose weight very rapidly, and in five months the loss amounted to thirty pounds. Within the last three or four weeks of his life he vomited a few times. His digestion became very poor. Frequently his food gave distress, and sour, windy risings from the stomach were distressing. Bowels inclined to be constipated; no jaundice. He suffered with piles, especially when the bowels were constipated. The lungs and heart were examined with negative results, excepting slight cardiac debility. His general circulation was weak, due to anæmia. When the patient came under our notice the above symptoms and history were obtained from Dr. Smith, and in addition we made careful examination of his abdomen and stomach. There was extreme emaciation, and the skin presented an ashy hue. The abdomen was depressed above (hypochondriac and epigastric regions) and distended in its lower portions. A small tumor could be felt in the right side above the umbilicus, and on auscultatory percussion the size of the organ was found to be enormous. Splashing-sounds were very evident. Inflation was practised, and the stomach was found to occupy the position represented in the accompanying diagram.

Repeated examinations of the gastric contents had been made and the total acidity was habitually decreased; free hydrochloric acid was never discovered. Lactic and butyric acids were occasionally present, but it is not stated that special precautions were taken to exclude lactates from the test-meals. Pepton was often found. Sarcinæ were seen microscopically; but no cancer-cells or acini.

The urine was high-colored and heavy (1028); contained excess of indoxyl, sulphuric acid, and a trace of albumin with fine granular casts.

The diagnosis of dilatation due to carcinoma of the pylorus was easily arrived at, and was subsequently confirmed by an operation performed by Drs. J. William White and W. W. Keen.

CASE III. *Obstructive(?) dilatation; movable kidney.*—Miss M. P., aged twenty-nine years, a typewriter by occupation, was admitted to the hospital December 10, 1893. Her father was killed in an accident; her mother was still living and had had an aneurism of the aorta. She had had the usual infectious diseases of childhood, and especially diphtheria, which she had three times. In November of 1891 she had typhoid fever. The following notes were recorded:

Her present illness seemed to begin in June of 1892, when she first began to suffer with pain in the left hypochondriac region and with flatulence. The ingestion of food was followed by burning pain and by heaviness, but there was no vomiting. Previous to this time she had suffered with no disturbances of the appetite or digestion, and her bowels had been entirely regular. In July of 1892 she was thrown from a carriage and severely bruised. From this time the symptoms continued and gradually grew worse until March, 1893, when vomiting commenced. The matters vomited were dark in color and always extremely sour. At first this occurred at long intervals, but finally during the summer it was sometimes repeated several times a day. The patient became very much wasted and constipation grew progressively more intense. There were no menstrual periods after August,

1893. She complained of continuous pain and sometimes of sharp parox-ysmal attacks.

Physical examination. The patient was emaciated and the abdomen rather flat. During the examination, however, a distention appeared below the border of the left ribs, constituting a veritable phantom-tumor. The per-cussion-note over this was low-pitched and tympanitic. Peristaltic waves were plainly visible, and on shaking the patient a succussion-splash was quite audible. The distention appeared and disappeared rather rapidly during the time she was under examination. The lower part of the abdo-men was somewhat fuller than the upper. In the right hypochondriac region and toward the umbilical region there was found a hard, kidney-shaped tumor which was painful on pressure and easily movable. The condition of the other abdominal organs and the thoracic viscera seemed normal.

The patient was ordered repeated rectal enemata, but diarrhœa set in and the treatment was discontinued. For some time the condition remained the same, and from time to time she had attacks of vomiting, the matters dis-charged frequently being remnants from the previous day.

Examination of the gastric contents, after an Ewald test-meal, showed diminished acidity (10 to 20 NaHO); no hydrochloric acid; lactic acid present (Uffelmann's test).

Careful regulation of the diet, for the most part peptonized milk; rest in bed; faradization over the stomach and back; cod-liver oil, given by the mouth or by inunction; and occasional intestinal lavage, constituted the treatment. Her condition gradually improved, and in the course of four months she had gained thirty pounds. The kidney-shaped tumor, which had been plainly palpable during the first two months, had gradually re-ceded until it was no longer palpable, and the stomach on physical exami-nation (by auscultatory percussion) was found to occupy its usual position and had seemingly the normal size.

The patient returned somewhat later, reporting that she had resumed her usual occupation, and she was found to be in excellent health, having suffered no further discomfort from indigestion, vomiting, or pain.

In this case inflation of the stomach was not practised, the diag-nosis of dilatation therefore resting upon the determination of marked failure in the motor power by the discovery of food-remnants in the fasting stomach, upon the apparent enlargement obtained by ausculta-tory percussion, together with the active peristaltic waves visible through the abdominal walls, and finally the subsequent disappearance of all of these conditions.

CASE IV. *Atonic and obstructive dilatation, due to a cicatrix in the anterior wall and adhesions surrounding the pylorus.*—P. D., aged fifty years, a shoe-maker by occupation, was admitted to the hospital January 3, 1896. The following notes were recorded:

The family history of the patient does not bear upon his illness. The patient was married and has five healthy children.

He was a healthy man excepting for an attack of malaria which he had ten years ago. He has used alcohol very little and tobacco not at all. He has always been careless in his habits of eating, bolting his food with insuffi-cient mastication. His appetite has always been good and he has habitually eaten large quantities of food.

About five years ago he had some trouble with his stomach, but no severe discomfort. Eructation of gases was the most pronounced symptom, and occasionally at long intervals he would vomit.

About a year and a half ago there was a severe spell, coming with a chill and accompanied by fever and vomiting, which confined him to bed for three months. The stomach was absolutely unretentive. He finally recovered

and returned to his work. Six months or a year later, however, he was seized with the same sort of an attack and was confined to bed for four months. During the attacks he lost much flesh, but on recovering again gained weight.

The summer after the last attack he felt as well as ever, but continued his habits of rapid eating, and about September, 1895, the present condition began.

The first symptoms were marked eructations of gases, heartburn, and continuous pain in the epigastrium. The latter was relieved by eating; but this food was not digested, and invariably was vomited after several hours in an undigested condition. Sometimes he has vomited enormous quantities of sour, watery, and yeasty matters, but has never noticed blood. His bowels are very costive and the quantity of urine is diminished. Now and then he complains of an aching pain running down the limbs.

Physical examination. The patient has an elongated frame. The lower part of the chest and the end of the sternum are depressed, as are also the epigastric and hypochondriac regions; whereas the hypogastric and lower umbilical portions are distended, and the superficial veins along the sides and front of the abdomen are enlarged.

The stomach was outlined by auscultatory percussion and was found to measure 17.5 cm. in a vertical direction and 22 cm. in the transverse direction. The lower border is on a line with the umbilicus; the upper border lies beneath the fifth rib. (The outlines are illustrated in Fig. 4.)

FIG. 4.
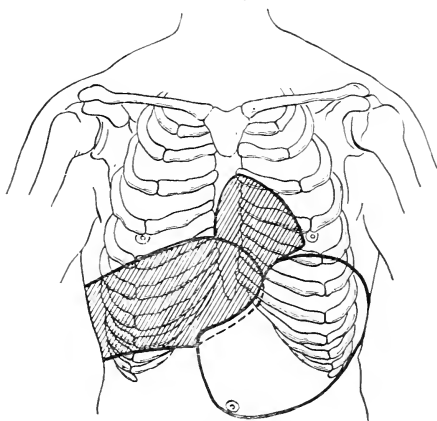
The cardiac outline is not increased and the liver is apparently normal in size. Careful palpation reveals no evidence of a tumor, but in the epigastric region toward the left costal border there is felt a distinct resistance.

The contents of the stomach were removed with the stomach-tube, and were found to consist of decomposed, sour, ill-smelling liquid. Chemical examination of this showed excessive acidity, varying from 30 to 120 on different occasions. There was always free hydrochloric acid, the amount of the latter varying from 10 to 50. Lactic acid was frequently present to Uffelmann's test; and on two occasions, when Boas's test-meal was given and all other precautions were taken, the reaction was still positive.

The stomach was emptied at varying periods after meals, and always con-

tained food-remnants; and not rarely vomiting would bring up food taken on the previous day. The amount of liquid discharged by vomiting was often very great (2500 to 3500 c.cm.).

The urine was usually a little turbid, alkaline in reaction, and varying in its specific gravity from 1015 to 1020. No albumin or sugar, but excessive deposits of alkaline salts (phosphates and carbonates). Indican was found in excess.

The patient was placed upon a carefully regulated diet of albuminous character. Lavage of the stomach and cold douches of the colon were given at regular intervals, and at times nutritive enemata were ordered. No improvement occurred, and operation was decided upon. This was performed by Dr. J. William White. On incision, the stomach was found enormously enlarged, and a dense scar was found in the anterior wall, at the point where the feeling of induration had been detected. The serous surface adjacent to this was thickened. The pylorus itself was healthy, but was constricted by fibrous adhesion springing from the head of the pancreas, the posterior wall of the abdomen, and other adjacent parts.

CASE V. *Atonic dilatation; great improvement after six months' treatment.*— P. J. J., aged twenty-five years, was admitted to the hospital October 20, 1893. There was nothing significant in the family history.

The patient began to work in the coal-mines at an early age and continued to do so until two years before he came under observation. Since that time he had been following various pursuits, but for the year previous was almost incapacitated. He had used alcohol habitually and was always an excessive eater; and, as he himself confessed, he "eat enough for two men."

During the last six years he had had occasional attacks of pain in the stomach. They occurred especially at a considerable interval after eating, and were frequently relieved by vomiting of sour liquids. Eructations of gases were frequent. The attacks increased in severity and frequency until they occurred almost after each meal and quite disabled him from work. His appetite continued excessive, excepting at times when the attacks were not relieved by vomiting. At such times the fermentation seemed to continue and the eructations were always more severe and lasting. The bowels are obstinately constipated, and he had pain in the back. The tongue was generally clean.

Physical examination. The patient has a long, narrow chest, and the xiphoid cartilage and the lower part of the ribs are depressed, as is also the epigastric region. The abdomen below the umbilicus is much distended. The superficial veins over the latter part are greatly enlarged. Auscultatory percussion discovers a decided increase in the size of the stomach, the pylorus being somewhat depressed, but the lower border extending fully to the umbilicus, which is placed at an abnormal distance from the xiphoid on account of the unusual shape of the patient. Careful palpation of the abdomen reveals no induration or tumor and the intestines appear to be normal. The heart and lungs are healthy.

The stomach-tube was introduced and removed considerable undigested food which had remained in the stomach a number of hours; and in washing out the organ it was found to hold two and one-half litres without difficulty. The stomach-contents contained slight excess of free hydrochloric acid, and showed lactic acid to Uffelmann's test.

The patient was placed upon a dry albuminous diet and was ordered lavage of the stomach and regular colonic douches. His condition steadily but slowly improved, and after six months he had gained materially in weight and general appearance. The physical examination of the stomach showed that the pylorus had resumed a more natural position, and the lower border had receded considerably from its former position on the level of the umbilicus. Vomiting had almost ceased, and lavage discovered no remnants of food after six hours.

The patient was finally discharged from the hospital, having gained twenty-three pounds in weight and having a comparatively healthy appearance.

CASE VI. *Enteroptosis; displacement of stomach, liver, and spleen; stomach outlined by auscultatory percussion.*—Mrs. B., aged forty-five years; housewife; admitted November 25, 1894.   The history obtained was as follows: her father died at the age of eighty-eight years of heart disease; her mother at seventy-seven years of pneumonia.   She had two brothers and one sister living and in good health.   One brother had died of pneumonia, one of typhoid fever, and one sister in infancy.   She herself had been a healthy child and woman; she had had the ordinary diseases of childhood, but not severely.   At nineteen she was married, and she had borne nine children.   There was one miscarriage at the fifth month.   All of her children were large and the labors were difficult.   One child weighed sixteen pounds and was delivered with the forceps.   The menopause occurred two years ago, since which time she has been growing stout; about the same time she noticed a tumor in the right side of the abdomen.   This was moderately painful, and changed its

FIG. 5.
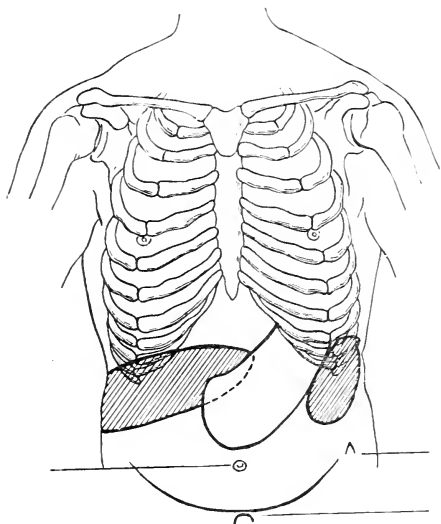
position with different positions of the body.   A little later she suffered with pains in the left side, and then noticed a tumor there.   When stooping she frequently had sharp pain in the right side, but she has never had any spontaneous paroxysms.   She has been moderately jaundiced several times.   At times there are shooting-pains around the left side, sometimes extending as far as the left arm, and occasionally she has suffered with attacks of palpitation.   She has had attacks of abdominal colic severe enough to produce semi-collapse; and not rarely, after eating, has a feeling of over-distention.   The bowels are occasionally loose.   She kept on with her housework despite her suffering until four weeks ago, when severe pains in her left side and in the left shoulder compelled her to give up.   Shortness of breath, which has always been present to some extent, still persists, and she has a troublesome morning-cough.

Physical examination. The patient is a very large woman, the subcutaneous fat being enormously increased but rather flabby. The abdomen is large and pendulous, so that the umbilicus is greatly depressed and the abdominal fold hangs down over the pubes. There is no fluctuation on careful bimanual palpation. The liver is plainly felt on the right side, the lower edge being 15 cm. below the border of the thorax, and the organ is easily movable up and down and laterally. On the left side the spleen is similarly displaced, the lower margin being 9 cm. below the ribs in the anterior axillary line.

Percussion discovers hepatic dulness 2.5 cm. below the edge of the ribs and extending downward 15 cm. and inward as far as the nipple-line. The position and the outline of the stomach were determined by auscultatory percussion. The area of tympany is on a level with the lower margin of the ribs. The lower margin is almost on the line of the anterior superior spines of the ilium. The umbilicus is displaced downward even below this point on account of the pendulous character of the abdomen. Posteriorly no difference could be detected by palpation or percussion of the two renal regions, though there were perhaps less resistance and dulness than normal on both sides.

Examination of the urine showed specific gravity 1030; pale amber color; no albumin; no casts; 1.3 per cent. of sugar. During her stay in the hospital the quantity of urine varied from forty-eight to fifty-eight ounces. Her temperature was about normal. Her pulse and respiration varied slightly from the normal. Examination of the blood showed 4,600,000 red corpuscles, 20,000 white corpuscles, and 60 per cent. hæmoglobin.

CASE VII. *Cancer of pylorus and liver; position of the growth and absence of dilatation determined by auscultatory percussion.*—D. C., aged forty-eight years, miner, was admitted to the hospital February 8, 1896. The patient's health had been good, though he had suffered with a number of lesser ailments.

FIG. 6.
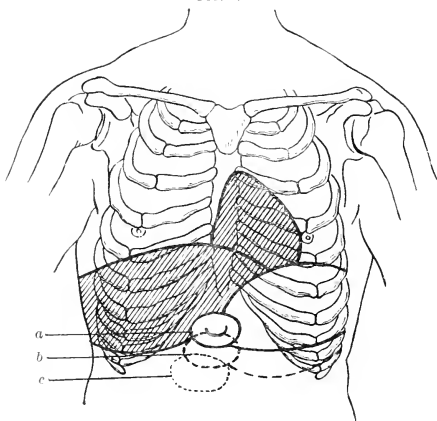
a. Ordinary position. *b.* Position on full diaphragmatic inspiration. *c.* Position when lying on right side. The last position is somewhat exaggerated in the diagram.

He had used alcohol freely, but was not a daily drinker. He chewed tobacco excessively. He was a rapid eater and habitually bolted his food. There was no venereal history.

When he entered the hospital he asserted that he had been entirely well

until three weeks previously, when he was suddenly attacked with a severe pain in the abdomen. This was unaccompanied by vomiting or other symptoms and lasted about two hours. The next night another attack occurred, and subsequently they grew more frequent, coming on several times a day. The pain was generally sharp and cramp-like in character.

On physical examination there was found a large tumor occupying the mid-epigastric region and seemingly connected with the lower border of the liver. This was somewhat movable with the respirations and could also be moved from side to side.

Auscultatory percussion of the stomach showed that the pyloric end lay posterior to the mass, and the size of the organ seemed rather restricted than enlarged. With change in position of the patient the position of the tumor and of the stomach-tympany was also somewhat displaced.

Examination of the stomach-contents revealed no remnants of food in the morning or at long intervals after eating. The acidity was reduced, varying from 26 to 42. Free hydrochloric acid was repeatedly discovered, the quantity varying from 15 to 20.

The urine was clear, with a specific gravity of from 1017 to 1025, acid in reaction, and containing some albumin—at times considerable, at other times little. An excessive amount of globulin over serum-albumin was striking. There was no sugar. Hyaline and granular casts and abundant leucocytes were found in the sediment.

The growth of the tumor seemed progressive, and finally it was determined to make an exploratory incision. This discovered that the tumor occupied the position between the border of the liver and the stomach, being attached to both. The stomach itself was not enlarged and occupied the position determined by auscultatory percussion.

CASE VIII. *Tumor of the liver; chronic gastritis; pyloric involvement excluded by auscultatory percussion and inflation; subvertical position of stomach.*—N. C. C., aged sixty-five years, a hotel-keeper, was admitted to the hospital July 18,

FIG. 7.
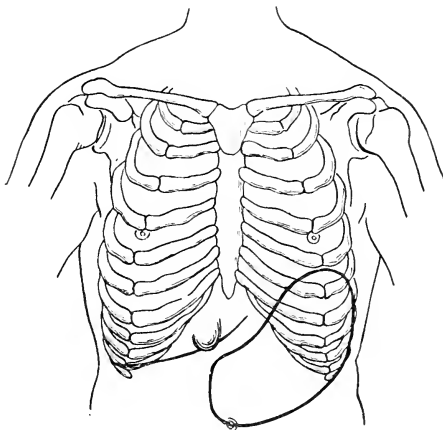
1895. He had always been a healthy man, but never worked hard. He used tobacco excessively until two years before, but drank only moderately. He ate very irregularly, and constantly bolted his food without mastication.

In April of 1894 he began to lose weight and suffered with a dry cough.

The loss of weight went on steadily until it amounted to fifty pounds. He became weak and sallow in color; his appetite varied, sometimes becoming ravenous. His bowels acted irregularly, but he was rarely constipated. Occasionally he vomited, but lately not at all. There was practically no pain.

Physical examination. The patient is emaciated, sallow, and almost cachectic. The abdomen is rather hollowed, and in the position of the lower border of the liver is seen a distinct, nodular tumor which moves with the respirations. Auscultatory percussion determined that the pylorus lies near the tumor in question or behind it. The liver begins at the fifth interspace and extends 3 cm. below the edge of the ribs. The hepatic dulness is continuous with that of the tumor noted.

The stomach-contents were removed after a test-meal, and hydrochloric acid was found present. Subsequently this test was repeated on numerous occasions, and generally there was found a slight amount of hydrochloric acid. Sometimes it was absent. Boas's test-meal was given on three occasions, but lactic acid was always absent. There never was any evidence of retention of food beyond the normal length of time, and the stomach was always empty in the morning before breakfast.

Examination of his blood showed 4,125,000 red corpuscles, 12,500 leucocytes, and 45 per cent. hæmoglobin. The red corpuscles were irregular in shape, but there was no marked abnormality.

The urine was normal in color, acid in reaction, and had a specific gravity of 1018. There was no albumin, no sugar, and no casts.

The stomach was distended with air on several occasions, and it was found to occupy the position seen in the diagram. The lower border was as low as the umbilicus, but the pylorus was also depressed, so that the descent of the lower border was more likely the result of dislocation than of dilatation. When the stomach was inflated it was easy to determine that the mass on the right side was not connected with the pyloric end, as the latter was separated by a distinct and easily determined interval from the tumor in question.

The patient was placed upon a tonic treatment, and was ordered careful diet and remedies directed to the general disturbances of his stomach, supposed to be the result of chronic gastritis.

There was some improvement for a time, but subsequently the condition relapsed. Finally operation was decided upon, and was performed by Dr. J. William White. The mass was found to be a nodular growth in the anterior surface of the liver and projecting also to a certain extent upon the posterior surface. The stomach was uninvolved. No portions of the growth were removed, but the wound was simply reunited. The patient subsequently improved almost without interruption, and when he finally left the hospital, three months later, had gained over twenty-five pounds in weight, and suffered no gastric or other disturbances.

THE IMPORTANCE OF A SYSTEMATIC MICROSCOPICAL EXAMINATION OF UTERINE SCRAPINGS AND OF EXCISED PIECES AS AN AID TO DIAGNOSIS, BASED UPON THE ANALYSIS OF ONE HUNDRED CASES.

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THE object of the present paper is to call attention once more to the advantages to be derived from a systematic microscopical examination of tissues removed from patients at gynæcological operations. It has for some time been a matter of routine with me to preserve for microscopical

examination all structures so removed, the findings in each case being recorded regularly in a systematic way. The results thus obtained have been by no means without interest. While it is true that in perhaps a majority of instances the microscopical examination simply verified more or less completely the diagnosis which had been previously arrived at from a careful clinical study of the case, it has not infrequently brought to light evidences of the presence of a malignant tumor whose existence had by no means been suspected. On the other hand, in several instances the microscope has proved a suspicion of malignancy to be unfounded, and in ordinary benign cases has thrown much light upon the exact nature of the existing process. And, lastly, in a small number of cases the microscopical examination has proved of the utmost importance in that it has placed us in a position to recognize a malignant process in its very earliest stages, and while it was still possible to remove the growth completely by operation, before it had given rise to metastases, or had spread by contiguity or continuity to such a degree that all attempts at complete removal would have been useless.

The importance of a microscopical examination of scrapings from the uterine or cervical cavity, and in distinctly suspicious cases of deeper portions of the cervix, or, indeed, of the uterus itself, excised for purposes of diagnosis, does not, in this country, seem to have been as yet sufficiently appreciated. The difficulties in the way of a general application of the method, it is true, are somewhat formidable. Thus, in addition to the technique and experience necessary to make the results of the examination of value, the question of time has to be considered, so that the majority of busy surgeons will be compelled to delegate the work to a well-trained assistant or to a pathological colleague.   In Europe, and especially in Germany and Austria, attached to the best clinics are a number of competent men whose duties as assistants include the making of such examinations, and gynæcologists in this country have long been in the habit, in doubtful cases, of submitting specimens for microscopical examination to pathologists in whom they have confidence. The tendency to make these examinations as a matter of routine is gradually growing, and the aid to be derived from the microscope in apparently simple as well as in doubtful cases is becoming more and more appreciated.

There has existed in the past an idea, now, fortunately, becoming less prevalent, that the result of the pathological examination in a clinically doubtful case is never certain. This, I think, grew out of the unreasonable demand of the clinician that, when his own methods failed in establishing a diagnosis, the pathological appearances should always be pathognomonic. While, however, the most enthusiastic supporters of the microscope as an aid to diagnosis are the most ready to admit their inability to give a positive statement as to the malignancy or non-

malignancy in every case, this much at any rate can be asserted: in cases which are doubtful clinically the microscope will sometimes clear up the diagnosis absolutely, and were such instances met with only once in a dozen, or even in a hundred patients, the results obtained would more than repay us for the time and trouble spent in the systematic microscopical examination of every case. The technical procedures employed in this branch of work are simple and can be easily carried out by anyone who has been trained in the ordinary histological and pathological technique. The experience necessary to form a satisfactory judgment as to the evidence concerning the presence or absence of a malignant growth in a given case, or as to the nature of inflammations, hyperplasias, and other changes, is indeed considerable; but we may safely assume that modern gynæcologists will not grudge time spent in preparing themselves for this work. The field for original studies in this direction, in which all modern histological and micro-chemical methods are applicable, is very wide and attractive; but, leaving out all such considerations here, it is my aim in this paper rather to lay stress upon the importance of the more simple work and that which is done for purposes of diagnosis alone. For the sake of clearness it may be well to outline briefly the routine followed in my own work, in which I have the help of a pathological assistant.

The Obtaining of the Material; its Preservation and Preparation for the Microscope. In the majority of cases the material which is to be examined is that which is brought away by curetting the uterus. For purposes of examination this material possesses decided disadvantages as well as advantages.

The two main advantages are (1) the ease with which such material can be obtained, even from regions, such, for example, as the fundus of the uterus, from which a portion of tissue can be excised only with difficulty; and (2) because it gives an opportunity to study portions of the mucous membrane from many different areas. The chief disadvantages that may be mentioned are: 1. In only a few of the cases does one obtain any of the muscular tissue from the body of the uterus, and scarcely any of the tissue, whether mucous membrane or muscular tissue, from the cervix. 2. The sections are necessarily made up of very small pieces, thus rendering it possible to miss just the tissue for which we are searching. 3. Examination of the material removed by curetting from the cavity of the uterus is frequently less satisfactory than the examination of tissues excised directly from the wall. This objection, as will be mentioned presently, applies even more strongly to scrapings from the cervical canal. 4. In curetted particles one necessarily loses almost all idea of the topographical relations of the tissue under examination.

With reference to the cervix, I am of the belief that it is almost

an impossibility to obtain with the curette suitable material for micro-
scopical examination. The mucous membrane adheres so closely to the
underlying fibromuscular layer that it is almost impossible to sepa-
rate it satisfactorily with any of the ordinary curettes. In order to
examine the mucous membrane of the cervix it is always much better
to excise a small wedge-shaped piece of tissue, which should include an
appreciable portion of the suspicious growth, and, whenever possible,
together with it a small portion of what is apparently healthy tissue.
The piece excised should be of sufficient size to enable us to handle
it readily and to recognize macroscopically its former relations. The
incisions should be made sufficiently deep into the tissues of the cervix
to include the bottoms of the glands, and should be carried some distance
up the cervical canal. After the required portion has been removed
the edges of the wound can be brought together by means of inter-
rupted silk or catgut sutures.

If an immediate microscopical examination of the tissue is not de-
manded, the scrapings may be satisfactorily prepared as follows : 1. They
are washed quickly in salt-solution or in cold water to free them from
blood as thoroughly as possible. We have found that the addition of a
small amount of sodium bicarbonate to lukewarm water facilitates this
procedure very much. The tissues should not be permitted to lie in
water or in salt-solution, however, as they will soon become macerated
and unfit for examination. 2. The specimens are then placed in 50 per
cent. alcohol for several hours 3. They are transferred to 97 per cent.
or to absolute alcohol. The former, as a rule, is sufficiently strong, and
although absolute alcohol is perhaps better, it has the disadvantage of
being much more expensive.[1]

The more solid excised portions should be allowed to remain for from
twenty-four to forty-eight hours in the stronger alcohol until they are
perfectly free from water. If, however, they are comparatively large,
it will be necessary to pass them previously through a number of alcohols
graded from 50 per cent. to absolute alcohol, since it has been found that
the transferrence of too large pieces directly from the 50 per cent. alcohol
solution to absolute alcohol will cause them to shrink extensively, so that
the various relations may be distorted. Thus, for example, we have found
that the epithelial cells often become detached from their base of sup
port. 4. The specimens are then usually placed in a mixture consisting
of equal parts of commercial ether and alcohol, in which they are allowed
to remain for twenty-four hours. They may then be placed in ether for
twenty four hours. This step, however, in our experience has proved to
be unnecessary and may be omitted. 5. They are next transferred to a

[1] The ordinary 97 per cent. alcohol may be converted into nearly absolute alcohol by the
addition of sulphate of copper from which the water has been dried off by heat, the alcohol
being afterward decanted off as required.

thin solution of celloidin (of about the consistency of milk), in which they are allowed to remain for twenty-four to thirty-six hours. 6. They are then placed in thick celloidin (of the consistency of treacle) for from twenty-four to forty eight hours or even longer. By employing a solution of a consistency about midway between that of the thin and that of the thick solution we have often succeeded in preparing sections of endometrial scrapings with a single solution ; but with portions excised from the cervix, or with pieces of relatively large size—over one centimetre square, for instance—it is advisable that they should be thoroughly saturated in both solutions. Instead of the ordinary celloidin, an excellent home-made substitute can readily be prepared by making ether-alcoholic solutions of photographers' fibre-cotton, which costs from about fifty cents to one dollar an ounce. 7. The specimens are next to be placed on small blocks made from wood, cork, paper, or glass. When dealing with uterine scrapings we usually place ten or twelve pieces on one block. 8. The " blocked " specimens are then allowed to remain for about fifteen minutes exposed to the influence of the air, until some setting and contraction of the superficial part of the celloidin have taken place. The blocks are then placed in 50 or 75 per cent. alcohol, and after several hours are ready to be cut with the microtome. When on the blocks and kept in the alcohol the specimens remain comparatively good for an indefinite length of time, although after some months, as a rule, sections which are taken from them do not stain so well as when they are cut shortly after the specimens have been prepared.

This " celloidin-imbedding method " is in general use in the preparation of pathological specimens, and is for ordinary work preferable to all others. For " ribbon-sections," or serial sections in continuous bands, the " paraffin-method " must be employed. It may besides be objected that the celloidin-sections are also somewhat thicker ; but certainly the after-handling of them is much easier and the method itself is simpler. Serial sections, though not in continuous bands, of course, can be made by the celloidin-method.

Some of the European gynecologists prefer to employ paraffin in preparing tissues for microscopical examination. The method is somewhat as follows : 1. The specimens are first hardened in absolute alcohol.   2. They are then placed for twenty-four hours in some solution in which paraffin is soluble. Chloroform, xylol, or an ethereal oil may be used for this purpose. 3. They are then saturated with paraffin, either directly by placing them in paraffin melting at 50° C. for twenty-four hours, or indirectly by permitting them to remain in an open vessel in a solution of paraffin in xylol at a temperature of 50° to 55° C., the xylol being gradually volatilized. 4. A small paper cell is prepared of sufficient size to hold the preparation and at the same time to allow considerable free space, which is first filled with melted paraffin of a slightly higher

melting-point. The specimens are then taken from the paraffin and placed in the cell in the desired position, hot needles being used for this purpose. The cell is then cooled either by exposing it to the air or by pouring cold water around it, after which the paraffin, which has now become a solid block, and which holds the preparation firmly imbedded in it, is removed from the cell and the sections can be cut with the microtome.

Besides alcohol for hardening and preserving tissues may be mentioned formalin, corrosive sublimate, and Müller's fluid. Formalin acts very quickly indeed in solutions even as dilute as 2 per cent., except in the case of mucous membranes, where even very strong solutions do not seem to harden tissues nearly so well as alcohol. It is especially good in dealing with gross specimens, and preserves the blood-cells in the sections. Formalin-tissues do not, however, stain satisfactorily in hæmatoxylin and eosin. The fumes are irritating and may produce an unpleasant and persistent coryza. With some individuals even in weak solutions it produces a peculiar dryness of the skin if allowed to come in contact with it for any length of time. The sensation which is thus caused is somewhat comparable with that following exposure to strong solutions of carbolic acid, but the effects are probably much more decided. Dr. Cullen, of the Johns Hopkins Hospital, advocates a formalin-method for rapidly preparing permanent sections.[1]

His method in brief is as follows : 1. The tissues are cut by means of the freezing-microtome. 2. The cut sections are placed in a 5 per cent. aqueous solution of formalin for from three to five minutes. 3. They are then placed in 50 per cent. alcohol for three minutes. 4. Then in absolute alcohol for only one minute. 5. Further treatment is carried out as with the ordinary celloidin-sections. Cullen advises that when possible the tissue should be hardened in a 10 per cent. formalin-solution for two hours before it is frozen and cut. He believes that this is of special value in preparing scrapings from the uterine cavity. The first method occupies about fifteen minutes, while the second consumes an additional two hours. Cullen says that by the latter method the blood in the tissues is partially retained and will stain to some extent, but not wholly satisfactorily. Personally we have not had any experience with this second method, but we propose to employ it in the near future. As was said before, the rapidity with which it penetrates and hardens the tissues makes formalin of special value in the preparation of gross specimens.

Corrosive Sublimate. A saturated solution in normal salt-solution fixes tissues well, if minute particles only are used. After being fixed the tissues are further hardened in alcohol. The metallic deposits may be

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[1] The full description of this method, which is one of the most valuable recently introduced, is to be found in the Johns Hopkins Hospital Bulletin, No. 49, April, 1895.

removed from the sections with tincture of iodine, and this in turn with 80 per cent. alcohol.

Müller's Fluid. The action of this fluid upon tissues is so slow that in the preparation of small tissues it is advisable to use other agents for fixing and hardening. It requires several weeks to harden small objects in Müller's fluid, and the fluid must be frequently changed.

When it is necessary to make an immediate examination of tissues it is best to cut the tissues into sections by means of the freezing-microtome, or better still, perhaps, to follow out Cullen's suggestion. It is to be remembered that only thin fragments are suitable for the freezing-micro-tome.[1] It is hardly necessary to mention that alcoholic specimens will not freeze unless the alcohol is first removed from them.

Although in normal histological work it is especially desirable to make thin sections, moderately thick ones can, as a rule, be utilized for pathological examinations. We have been able to obtain at times very thin celloidin-sections by properly diluting or strengthening the alcohol which is employed in keeping the knife and specimen moist. We find, however, that absolute alcohol is not to be recommended, as it will render the celloidin sticky, and may even dissolve it. About 85 to 90 per cent. is the limit of strength which should be employed for this purpose. The sections which are cut away may be removed from the knife-blade either with the flat of the finger, or, better still, by means of a moderate-sized camel's-hair brush, which may also be employed to keep the knife and specimens wet. These sections when cut are put into the 75 per cent. alcohol, and are now ready for staining.

Staining of Sections. A great variety of staining-methods are in use, but for ordinary pathological work in gynæcology a few simple stains suffice. Much can be learned as to " form-relations " from the study of unstained specimens ; but for finer histological changes staining with one or more dyes is highly desirable. Delafield's hæmatoxylin alone or in conjunction with eosin as a counter-stain yields excellent results, especially if acid alcohol be used as a differentiating fluid. Carmine, picro-carmine, and Van Giesen's mixture are valuable general stains. For demonstrating bacteria in specimens the four following methods[2] are the most common in use for purposes of diagnosis : 1. Gram's method, either simple, or Gram's method with previous staining with picro-lithium carmine. 2. Weigert's fibrin-stain, which stains many forms of bac-teria, fibrin, hyaline, and sometimes elastic tissue. 3. Carbol-fuchsin. 4. Methylene-blue.

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[1] An excellent description of the technique of the freezing-microtome will be found in Fried-länder's Microscopische Technik or Kahlden's Histologische Untersuchung.

[2] These methods are fully described in the books on microscopical technique.

The Clinical Records of the Cases.

In order to enhance the value of the microscopical examinations I have made it a rule to keep parallel clinical protocols of the cases, paying particular attention to the following points :

Name, age, social condition, residence, color, occupation.

Number of labors, whether instrumental or not. Age of oldest and youngest child ; character of puerperia.

Miscarriages or abortions ; at what period of pregnancy. Any possible sequelæ.

Menses. Age at first appearance. Regularity ; amount ; duration ; whether painful or not. Date of last menstrual period.

Leucorrhœa ; whether present or not. Character of discharge, whether irritating or not ; color and amount.

Micturition ; any disturbance noticed by patient.

Bowels. Usual condition ; general effects of laxatives and purgatives.

Family history.

Personal history.

Patient's chief complaints ; *i. e.*, those subjective symptoms which led the patient to present herself for treatment or diagnosis.

Present condition, embracing a thorough physical examination.

Examination of urine, chemical and microscopical.

Results of the examination : (1) without anæsthesia, (2) under anæsthesia.

The Histological Protocols.

In studying the sections particular attention is paid to the following points, and the results are recorded :

1. *The superficial epithelium ; i. e.*, the layer of epithelium lining the cavity of the uterus.

Character of cells :

Ciliated or not.

Single layer or multiple layers, etc.

2. *Utricular glands :*

Course.

Length.

Size.

Lumina.

Shape.

Glandular epithelium. Character of cells :

Ciliated or not.

Single layer or multiple layers.

3. *Stroma.*   Size of cells.   Physical characteristics.

Different sorts of cells:

     Lymphoid.

     Ovoid or round.

     Fusiform or spindle.

Peculiarities in arrangement of cells.

4. *Vessels.*   Those near the superficial mucous membrane, and those further away from the surface.

5. *Muscular tissue.*   If present or not ; and if any peculiarities noted.

6. *Cervical tissues.*   If present or not ; and if any peculiarities noted.

7. *Histological Diagnosis.*

8. *Notes or Remarks.*

In this way it will be seen that the careful clinical history which is taken of the cases and the histological findings are made to supplement one another.   A discussion of the many different points to be considered in the diagnosis of the specimens is impossible in the present paper. Fortunately, however, we now have at our disposal a rich literature upon the subject, and especially worthy of mention in this connection are the work of Ruge and Veit on *Uterine Carcinoma,* Abel's *Technik und Diagnostik in der Gynäkologischen Praxis,* and the section of Orth's *Pathology,* entitled " Weibliche Geschlechtsorgane."

<p align="center">TABLE I.</p>

	Normal endometrium.	Endometritis glandularis.	Endometritis interstitialis.	Endometritis glandularis et interstitialis.	Endometritis post partum sive post abortium.	Adenocarcinoma.	Squamous carcinoma.	Sarcoma.	Material insufficient, or, diagnosis doubtful, or malignancy doubtful.
Total cases	100	22	31	24	5	8	2	3	0	5
a. Cases in which clinical symptoms pointed to benign disease. Microscope showed absence of malignant disease	67	17	20	15	4	7	...	...	...	4
b. Cases in which clinical symptoms pointed to benign disease. Microscope showed presence of malignant disease	2	...	...	...	...	...		...	2	
c. Cases in which clinical symptoms pointed to malignant disease. Confirmed by microscope.	2	...	...	...	...	...	1	1		
d. Cases clinically suspicious as to malignancy ; microscope showed undoubted malignant disease	1	...	...	...	...	...	1	...		
e. Cases clinically suspicious as to malignancy ; microscope showed absence of malignant disease	28	5	11	9	1	1		...	...	1

TABLE I.(*a*)—CLINICAL SHEET.

	Normal endometrium.	Endometritis glandularis.	Endometritis interstitialis.	Endometritis glandularis et intestitialis.	Endometritis post partum sive post abortum.	Adenocarcinoma.	Squamous carcinoma.	Sarcoma.	Material insufficient, or diagnosis doubtful, or malignancy doubtful.
Pain absent	3	1	2	1	2				
continuous	3	2	4	...	...	2	2		
intermittent	15	27	15	4	4	...	1	...	5
worse at periods or on exertion	11	19	11	3	5	1	1	...	5
lancinating or sharp	4	9	10	2	1	1	2	...	4
dull or boring	10	21	9	3	3	1	1	...	1
limited to pelvis	17	29	19	4	4	1	2	...	5
headache	3	6	2	...	...	...	...	...	1
backache	12	21	11	5	5	1	1	...	5
Discharge, moderate	7	13	11	4	5	1	...	...	2
absent	2	8	5	...	...	...	2	...	2
profuse	13	10	8	1	3	1	1	...	1
Menses, amenorrhœa	2	...	1	...	1	1	...	...	1
too frequent	3	6	6	2	...	1	1	...	
too infrequent	2	3	4	1	1	...	2	...	1
regular	15	22	13	2	6	...	...	...	3
scanty	5	6	6	1	1	...	2	...	1
profuse	9	17	8	3	3	1	1	...	2
normal in amount	6	8	9	1	3	...	...	...	1
normal in duration	10	18	12	1	2	...	1	...	2
too long in duration	6	10	6	3	5	1	1	...	1
too short in duration	4	3	5	1	...	...	1	...	1
painless	10	13	7	1	2	...	2	...	2
painful	10	18	16	4	5	1	1	...	2
with clots of blood	3	5	3	2	3	1	1		
Metrorrhagia	2	3	...	1	5	2	1	...	1
O-parous women	10	16	12	4	3	1	...	...	3
Parous women	12	15	12	1	5	1	3	...	2
Abortion diagnosed clinically	...	...	...	...	2	...			
Results of treatment:									
cured	1	...	...	...	...	...	1		
benefited permanently	14	20	18	1	8	...	1	...	2
temporarily	7	10	6	3	...	2	1	...	3
unimproved	...	...	1	...	1				
died	...								

CONCLUSIONS. A study of these tables, in which the results of the parallel examinations of 100 cases have been systematically arranged, reveals a number of interesting points.

Thus, in Table I., it will be seen that of 100 cases the question of malignancy or benignancy could be settled in 95. In 2 cases which clinically appeared to be benignant, positive and timely evidence was given of malignancy by the microscopical examination. In 2 cases in which the clinical symptoms pointed to malignant disease the microscope enabled us to confirm the clinical diagnosis beyond all doubt. In 1 case in which there was clinically at least a warrantable suspicion of malignancy the microscope changed the condition of suspicion to one of certainty. In 26 cases in which the clinical symptoms rendered the suspicion of malignancy at least warrantable the microscopical examination proved the absence of malignant disease. In 63 cases in which the clinical symptoms pointed to a benign disease the microscopical examination confirmed the clinical diagnosis or showed a normal endometrium.

TABLE I.(b)—HISTOLOGICAL SHEET.

	Normal endometrium.	Endometritis glandularis.	Endometritis interstitialis.	Endometritis glandularis et interstitialis.	Endometritis post partum sive post abortum.	Adenocarcinoma.	Squamous carcinoma.	Sarcoma.	Material insufficient, or diagnosis doubtful, or malignancy doubtful.
Superficial epithelium:									
wanting, or insufficient for diagnosis	2	3		1	1	2	2	...	2
single layer	20	26	24	1	7	...	1	...	3
multiple layers	...	2	2						
high columnar	16	19	15	2				...	3
medium columnar	3	8	6	1	3	...	1		
low columnar or cuboidal	1	4	4		4				
ciliated	17	24	15	3	2	...	1	...	3
cilia not demonstrable	3	4	9		5				
character of epithelium undetermined (not sufficient to judge from)	...	...	...	1	...	...	...	...	1
Utricular glands:									
wanting or material insufficient	...	...	...	...	1	...	1	...	1
course, tortuous or zig-zag	1	31	9	4	6				
straight or nearly so	21	...	15	1	1	...	1	...	2
number, increased	...	18	4	1	2	2			
normal	22	6	6	1	2	...	1	...	1
diminished	...	1	10	2	3	...	...	...	1
size of lumina, regular	17	...	4	...	...	...	1	...	1
irregular	5	31	20	5	6	2	...	...	3
shape of lumina regular	20	...	21	1	...	...	1	...	2
irregular	2	31	3	4	7	2	...	...	2
invaginated glands	8	21	13	2					
Glandular epithelium:									
wanting or insufficient to judge from	...	...	...	...	1	...	1		
single layer	22	28	24	5	6	1	1	...	5
multiple layers	...	7	3	2	3	2			
high columnar	19	18	20	3	2	...	1	...	4
medium columnar	3	10	4	1	1	1			
low columnar or cuboidal	...	3	...	1	5	2	...	...	1
ciliated	20	22	23	5	3	...	1	...	4
cilia not demonstrable	1	9	1	...	4	2	...	...	1
undetermined	1	...	...	...	1				
Stroma:									
small round and ovoid cells with fusiform cells around gland lumina	20	27	13	3	5	1	1	...	4
round or oval cells, varying in size, some large, some small	1	4	7	2	2	...	...	...	1
bands of spindle-cells running through stroma	...	...	18	2	1				
spindle-cell element in excess	3	1	23	3	2	1			...
cells crowded closely together	4	11	6	1	1	...	1		
cells not closely packed together	1	4	4	...	1	...	...	...	1
lymphoid cells	12	13	12	1	6	1	2	...	2
polynuclear leucocytes	13	14	10	...	6	2	...	...	3
regularly distributed	3	6	3	...	2				
grouped in spots	...	2	...	...	...	2			
free red blood-cells numerous	14	18	12	3	3	...	...	...	1
few	4	5	4	...	1	...	...	...	2
decidual cells	...	...	...	...	8	...	...	...	1
Vessels, numerous	14	20	15	3	8	2	...	...	1
scanty or none found	8	11	9	2	...	...	...	...	4
dilated	10	16	13	3	8	1	...	...	2
collapsed	6	8	4	...	...	...	1	...	4
Muscle-tissue, present	4	4	5	...	1	1	1	...	3
absent	18	27	19	5	7	1	2	...	2
Cervical tissue, present	1	2	1	...	2	...	2	...	2
absent	21	29	23	5	6	2	1	...	3
Placental villi, chorionic or amniotic remnants	...	...	...	...	5				
	22	31	24	5	8	2	3	0	5

In Table I.(*a*) the clinical symptoms met with in different conditions of the endometrium and in some few malignant conditions have been tabulated.

Pain. In 22 cases in which the microscope showed normal or approximately normal endometrium pain was absent in but 3 cases. This is a point we think worthy of some emphasis, inasmuch as it proves the possibility of the existence of painful affections referable to the uterus, in cases in which histological changes, at least by the methods ordinarily employed, are not demonstrable. In 31 cases of endometritis glandularis pain was absent in but 1 case. In 24 cases of endometritis interstitialis pain was absent in only 2 cases. In 5 cases of endometritis glandularis et interstitialis pain was absent in but 1 case. In 8 cases of endometritis post abortum sive partum pain was absent in but 2 cases. In the 5 malignant cases it was not absent in a single instance, and was generally continuous. In 30 cases of endometritis glandularis dull pain occurred in 21 and sharp pain in 9. In 19 cases of endometritis interstitialis dull pain occurred in 9; sharp pain in 10. In endometritis glandularis et interstitialis, 5 cases, dull pain occurred in 3 and sharp pain in 2. This would seem to show that in cases of glandular endometritis dull or boring pain is more frequently met with than sharp or lancinating pain, while to a somewhat less extent the reverse is true in cases of interstitial endometritis. The pain complained of is in the great majority of instances limited to the pelvis or to the lower portion of the abdomen. We found this to be true in about 80 per cent. of cases. Headache is a rather infrequent symptom, being met with but 12 times. Backache is much more frequently met with, being recorded 61 times.

Discharge. In 22 cases in which the microscope showed normal endometrium discharge was absent in but 2 cases, and in 20 cases it was considerable in amount. In these cases the discharge probably originated from the cervix, and not from the body of the uterus; that is to say, the cases, or the majority of them, must have been instances of " cervical " endometritis. In 31 cases of definite glandular endometritis discharge was absent in 8 cases, or in nearly 25 per cent. This shows that leucorrhoea is by no means always present in such cases. In 24 cases of interstitial endometritis leucorrhoeal discharge was absent in 5 cases, or in about 20 per cent. This is also interesting when considered together with the immediately preceding statement. In 8 cases of endometritis following abortion or labor a leucorrhoeal discharge is noted in every case. In 2 cases of adenocarcinoma, one of the cervix, the other of the fundus of the uterus, a leucorrhoeal discharge was present in both cases. In 3 cases of squamous carcinoma leucorrhoeal discharge was absent in 2 cases, and was profuse in 1 case. In the two cases the disease being incipient, there were, in fact, no well-marked clinical symptoms such as would have rendered one even suspicious of a malignant condition. It

was only in the course of the routine examination of all tissues that the presence of a malignant growth was demonstrated. In the third case carcinoma could be diagnosed clinically, but the condition unfortunately had progressed too far to admit of a removal of the uterus.

Menses. Regularity. In the majority of cases the menses are noted as being regular. It is interesting to note that in 8 cases of endometritis after abortion, or after labor, the menses are noted as being regular in 6.

Amount. In 31 cases of glandular endometritis the amount was scanty in 6; profuse in 17; normal in 8. In 24 cases of interstitial endometritis it was scanty in 6; profuse in 8; normal in 9. We shall watch with interest the results in such cases in the future in order to see if the relations here presented be characteristic in these diseases. The table shows that in over 50 per cent. of cases of glandular endometritis profuse menstruation was met with, but in only 33 per cent. of cases of interstitial endometritis was the same condition found. In 8 cases of endometritis post abortum sive partum menstruation is recorded as profuse in but 3. In only one of the eight cases is amenorrhœa noted. Five of these eight patients are recorded as having the menstrual period of too long duration. Of the 2 cases of adenocarcinoma, one patient was past the menopause, being about sixty or sixty-five years of age. She had had a very trifling hemorrhage from the uterus previous to her admission into the hospital. This was the only symptom that the patient complained of; but she had been further told by her attending physician that there was no malignant disease of the uterus, and on physical examination alone nothing could be made out suggesting such a condition. As regards painfulness or painlessness of menses, pain seems to be more constantly present in the interstitial form of endometritis than in that of the glandular type; in endometritis interstitialis, 23 cases, the menses were painful in 16, painless in 7, with clots of blood noted altogether 18 times. Out of 8 cases of endometritis post abortum sive partum pain was present in 3 cases.

Metrorrhagia was noted twice in 22 cases in which the endometrium appeared to be normal on microscopical examination; three times in 31 cases of endometritis glandularis; in no instance in 24 cases of endometritis interstitialis; five times in 8 cases of endometritis post abortum, sive partum; twice in 2 cases of adenocarcinoma; once in 3 cases of squamous carcinoma. It is interesting to observe that in 8 cases of endometritis post abortum sive partum abortion had been diagnosed in but 2 cases. Exactly what proportion of these 8 cases were post abortum and what post partum I was unable to say, but three of the 8 cases are recorded as occurring in nulliparous women. In 1 case placental villi were found in a fairly well preserved condition nine months after the abortion was said to have taken place.

Results of Treatment. No deaths are recorded. Two cases are classed

as unimproved. In the majority of cases, 64, treatment effected a permanent benefit ; temporary benefit was experienced in 32 cases.

Of the malignant cases, in 2 cases of adenocarcinoma temporary benefit was recorded. In one of these cases radical treatment was impossible on account of the local extent of the disease and the occurrence of metastases. In one case the age of the patient and her general condition compelled the writer to advise against any operation, although the disease was not advanced. One of the cases of squamous carcinoma reported as temporarily benefited has had a third operation for curetting and cauterization since, and is in a very precarious condition, the disease now involving the bladder and rectum. In the other two cases vaginal hysterectomy was performed over two years ago and the patients have been up to the present time free from any return, and are apparently in excellent health.

TABLE I.(b).[1] *Superficial epithelium.* In the majority of instances a single layer was demonstrated. Multiple layers are noted in two cases each of endometritis glandularis and endometritis interstitialis. We should say here in passing that the determination of the question whether a single layer or multiple layers are present is attended with a great deal of difficulty. One has constantly to keep in mind the readiness with which the appearance of multiple layers is produced by oblique section and by thick sections, so that considerable experience in interpreting the microscopical image is demanded. We cannot agree with some authors that a multiple layer of epithelium, either of the superficial or glandular type, is of itself a sign of malignancy. The appearance may be accounted for in several ways ; it may be due, for example, to shrinkage and distortion of the specimen during preparation, to oblique and thick sections, and possibly to other causes. We believe also that, in the majority of instances where these external causes may be excluded, multiple layers denote merely a hyperplasia of the cells.

With regard to the height of the cell, Abel has pointed out that low or medium columnar cells are suspicious of pregnancy. Now, in eight of our cases of endometritis post abortum sive partum low or cuboidal epithelium is noted in four cases and medium columnar in three. This effect of flattening out the cells, which may indeed go so far that the superficial epithelium becomes changed into a sort of endothelial membrane with cells having more breadth than depth, and resembling endothelial cells very closely, is probably, though not entirely, the result of pressure. We have noticed similar flattening of cells in cases of ectatic glands and in cases of hydrosalpinx, where the pressure of the contents must have been greater than the usual pressure which is exerted upon the cells.

The presence or absence of cilia. In the majority of cases cilia were found, their absence being recorded only 21 times. In 8 cases of endometritis post partum or post abortum they were demonstrated in but 2 cases and not demonstrated in 5 cases.

Utricular glands. A tortuosity of the glands, probably in the lower layer of the mucous membrane, seems to be an almost constant finding in cases of endometritis post abortum sive partum. There is also some irregularity in the size and more especially in the shape of the glands in these cases. Invaginated glands were found 8 times in 22 cases, where the endometrium had to be designated as normal ; 21 times in 31 cases of endometritis glandularis ; 13 times in 24 cases of endometritis interstitialis ; twice in 5 cases of endometritis glandularis et interstitialis.

FIG. 1.
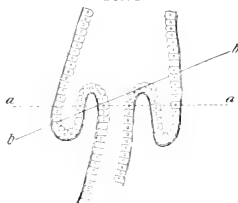
FIG. 2.
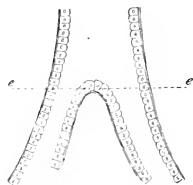
FIG. 3.
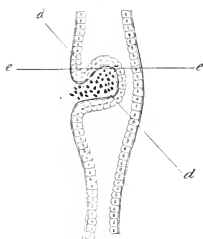
FIG. 4.

FIG. 5.

Section *e-e* in Fig. 2.

Section *a-a* in Fig. 1.

Invaginated glands or sections of lumina within lumina, or rather the appearance of such things in the microscopical section, may be produced in a variety of ways. A pictorial representation will illustrate this to better advantage than can be done in other ways. Fig. 1 represents a true intussusception or invagination of a utricular gland. Fig. 2 shows a uterine gland dividing dichotomously. Fig. 3 shows a papillary projection into the lumen of gland. The lines *aa* to *ee* represent sections. If these be made perpendicular to the plane of the paper, we should have somewhat the result pictured in Figs. 4 and 5. The papillary projections in Fig. 3 may appear somewhat diagrammatic, but we have seen just such a condition under the microscope.

Glandular epithelium. What has been said of the superficial epithe-lium holds true also for that of the glandular type. Multiple layers, however, are more frequently met with in the glands.

Stroma. The typical normal stroma may be said to consist of small round or oval cells, almost, but not quite, as small as lymphoid cells, all of about one size, with a single layer of fusiform cells round the gland lumina. These fusiform cells make the membrana propria for the gland-ular epithelium. They show the fusiform shape under the microscope,

FIG. 6.
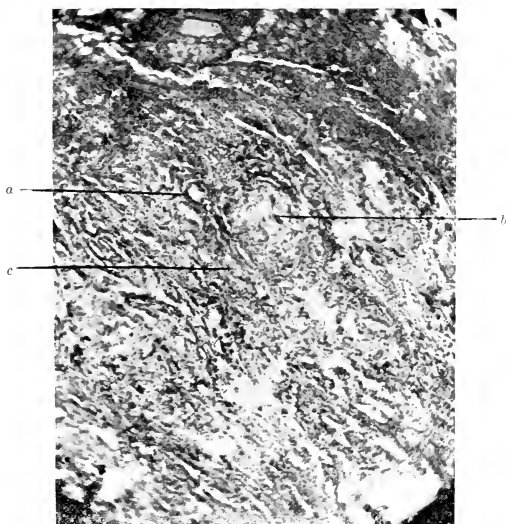
Adenocarcinoma of the cervix uteri.
a. Gland-ducts, but little changed. *b.* Alveolus filled with flat cells. *c.* Atypical gland-duct.

but they are probably flat endothelial-like cells. We can readily under-stand this when represented pictorially. These cells which appear to be fusiform are in all probability only endothelial like cells, through which perpendicular sections have been made. In 20 of the 22 cases of nor-mal endometrium and in 27 of the 31 cases of endometritis glandularis this condition was found. In 13 of the 24 cases of endometritis inter-stitialis, in 3 of the 5 cases of endometritis interstitialis et glandularis, and in 5 of the 8 cases of endometritis post abortum sive partum these structures could easily be made out. In all of these last 8 cases, however,

decidual cells were also found. It is interesting to note in this connection the behavior of the stroma-cells to staining with the different dyes. It was found when using the picro-carmine method that the nuclei of the small round and oval cells stained intensely with the carmine, while the cell-bodies, though taking on faintly the same stain, did not stain at all with the picric acid. In other words, unless they are undergoing some degenerative process, no yellow tint could be seen in them. Blood-cells, on the other hand, whether free in the stroma or inside the vessels, stained intensely with the picric acid. The cell-bodies stained with

FIG. 7.
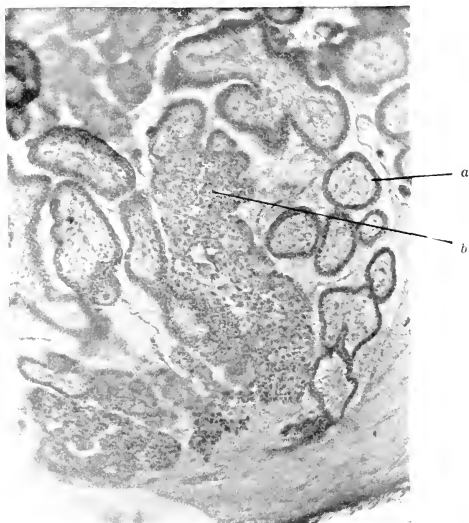
Decidual remnants and placental villi.
a. Placental villus. *b.* Large piece of decidua showing large decidual cells.

eosin, however, but faintly. Decidual cells took on the eosin-stain deeply, and one could recognize them even with low powers by the peculiar pinkish tinge of the section whenever they were present in sufficient numbers. In 7 cases of endometritis interstitialis out of a total of 24, and in 4 cases of endometritis glandularis out of 31 cases, the stroma-cells are noted as varying much in size, some being larger, some smaller than normal. Giant cells with many nuclei were seen in quite a number of the cases of endometritis post abortum sive partum.

The exact record of the number of times of their occurrence, unfortunately, has not been noted, but I can recall three instances in which they were found. In one case they were so numerous as to give rise to a suspicion of giant-celled sarcoma, there being at the time no clinical history of abortion or miscarriage, and the fœtal structures not being positively demonstrable. The answers of the patient, however, upon being closely questioned as to the occurrence of an abortion, previous to her applying at the clinic, went to show that she had miscarried. Histologically the picture presented by the section under the microscope resembled closely that of a myosarcoma.

FIG. 8.

Papillary growth encroaching upon lumina of glands.
a. Pedicle. b. Foreign body. c. Complicated papillary growth. d. Bloodvessels.

Bands of spindle-cells in the stroma were observed 18 times in 24 cases of endometritis interstitialis, while the spindle-cell elements were found in excess 23 times. Very characteristic pictures in endometritis interstitialis are the concentric whorls of spindle-cells which form around the gland lumina. Instead of the normal single layer of spindle or fusiform cells, sometimes as many as ten layers may be seen. In many places these cells are seen to be compressing the gland, and the gland-

epithelium is undergoing degenerative changes, sometimes of the nature of simple atrophy, while sometimes active degenerative changes—*e. g.*, cloudy swelling or necrosis—have taken place.

Polynuclear leucocytes were found free in the stroma as follows : in 22 cases of normal endometrium, 13 times ; in 31 cases of endometritis glandularis, 14 times ; in 24 cases of endometritis interstitialis, 10 times ; in 8 cases of endometritis post abortum sive partum, 6 times.   Just what their presence signifies it is hard to say.   In most of the cases they were found sparsely, but more or less regularly distributed, not being present

Fig. 9.
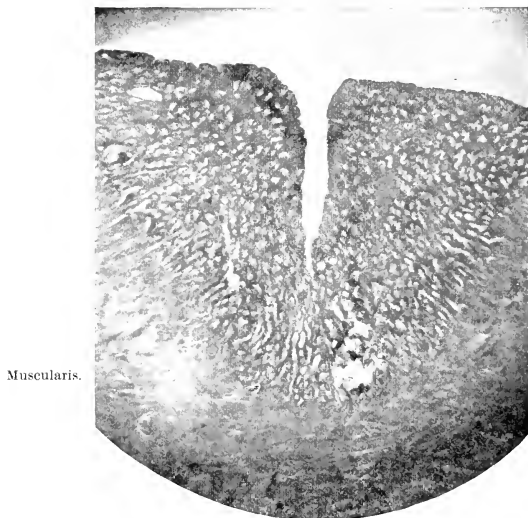
Muscularis.

Endometritis glandularis hyperplastica.
The cleft in the middle of the section is part of the cavity of the uterus.

in great numbers and evidently not representing inflammatory infiltration.   Their almost constant presence (in six out of eight cases) in cases of endometritis post abortum sive partum would seem to indicate that they are perhaps playing some *rôle* in the involution of the mucosa. It is evident, however, that their presence in the uterine mucosa (when sparsely and regularly distributed) is of no great pathological significance.

Free blood-cells were also frequently met with ; in 22 cases in which the endometrium has been classed as normal, 18 times ; in 31 cases of

endometritis glandularis, 23 times ; in 24 cases of endometritis intersti-
tialis, 16 times ; in 5 cases of endometritis glandularis et interstitialis,
3 times ; in 8 cases of endometritis post abortum sive partum, 4 times.
The explanation of their presence in such a number of cases with nor-
mal endometrium does not seem clear. What their *rôle* is, apart from
the phenomena of menstruation, we do not understand.

Decidual cells were found in all the 8 cases of endometritis post abor-
tum sive partum. True decidual cells were not found in any of the
other conditions, though cells approaching them closely in size were often
found in cases of interstitial endometritis.

FIG. 10.
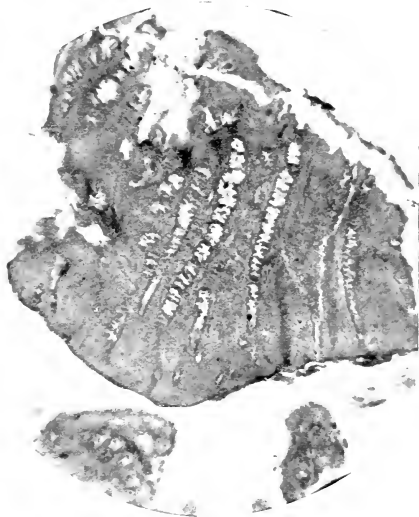
Endometritis glandularis hypertrophica. Specimen obtained by curetting.

Vessels. No true arteries or veins are found in the superficial layers of
the mucosa. Here the bloodvessels are all venous or arterial capillaries,
the latter far outnumbering the former. In all 8 cases of endometritis
post abortum sive partum the vessels were found dilated.

Muscular Tissue and Cervical Tissue. We desire to call attention espe-
cially to the infrequency with which muscular tissue and cervical tissue
were met with. Muscular tissue is recorded as being present in but 19
cases. Cervical tissue is recorded as being present in but 11 cases.

The above table includes several cases in which sections were made

from the cervix, so that cervical tissue really was obtained by curetting even fewer times than would at first appear from the table.

Fig. 11.
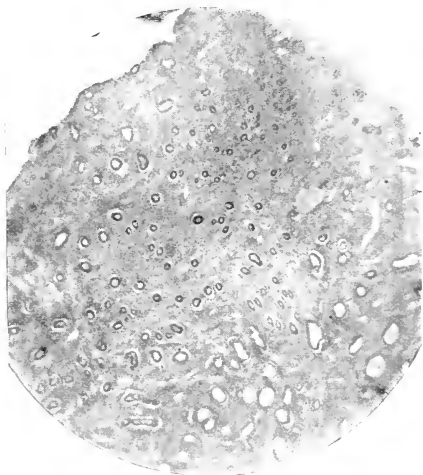
Endometritis interstitialis.   Specimen obtained by curetting.

Placental villi, chorionic or amniotic remnants, were found in 5 cases of endometritis post abortum sive partum.   We are inclined to the opinion that, lacking a clinical history of abortion or pregnancy, it is impossible in many instances to make an absolute diagnosis of a foregoing pregnancy unless such fœtal remnants be demonstrated.   Their presence, however, must be considered, of course, as proof positive of a preceding pregnancy.

In conclusion, I wish to thank my assistant, Dr. Walter R. Lincoln, for valuable aid in the preparation of the tissues and in the laborious analysis of the cases.

The several micro-photographs illustrate typical microscopic findings in some of the cases to which we have referred.

ANÆSTHESIA-PARALYSIS.

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THE discovery by which surgical operations were rendered painless is the fairest leaf in the rich wreath of laurels won by American surgery, ranging in its universality of application even above ovariotomy and ecphyadectomy.[1]

This blessing to suffering humanity, by which alone the gigantic strides of modern surgery have become possible, is, however, not free from danger. It was soon noticed that some patients, while being operated upon or even before the operation began, died. It was furthermore noticed that occasionally the extensor muscles of the forearm and the hand were paralyzed, a phenomenon that found an easy explanation in the arm having been allowed to roll out and hang in such a way over the edge of the table that protracted pressure was exercised on the region where the musculo-spiral nerve, after leaving the groove on the humerus, turns forward and becomes superficial at the lower end of the deltoid. This paralysis is in every respect analogous to that observed in a drunken man falling asleep with his arm hanging over the back of a chair; or in laborers carrying great weights on their shoulders; or after childbirth, when the patient is unable to use the muscles innervated by the peroneal nerve, that is to say—to bring the foot in dorsal flexion, to extend the toes, or rotate the foot outward—or unable to rotate the thigh inward or to bring it forward on account of a paralysis of the superior gluteal nerve, in both of which cases the paralysis is due to a pressure exercised on the lumbo-sacral cord where it passes over the brim of the pelvis and becomes compressed between the head of the child and the bone.

It is also a well-known fact that, if too much force is exercised in tightening the rubber tube or bandage used in Esmarch's bloodless method of operating, the patient is apt to wake up with a paralysis of the muscles supplied with nerves from the trunks thus exposed to injury.

But there are other kinds of disturbances in the functions of the nervous system connected with the administration of anæsthetics which have received little or no attention in this country, and only within the last two years have been described in Germany and France. When

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[1] The terms *ecphyaditis* and *ecphyadectomy* are derived from *ecphyas*, the Greek name for the appendix vermiformis, and, being composed of purely Greek roots, are preferable to the hybrid formations *appendicitis* and *appendicectomy*.

I observed my first case of this kind nothing was yet written upon the subject. The phenomenon being entirely new to me, I was inclined to look for its causation in the great anæmia of the patient; but soon it became clear that pressure, at least, was an important factor in the production of the faulty innervation observed in such cases.

If we take into consideration that in my first case it took six months to cure the patient; that in some of those observed abroad the affection has lasted for years; that some patients suffer considerable pain; and that some have lost their lives from the effect of the anæsthetic, it is evident that we have to deal with a group of symptoms which are of considerable importance, which demand our serious study, and which we must, as far as possible, try to avoid.

Before going any further, I shall give the history of my cases. I am fully aware of the very imperfect way in which the nervous abnormalities have been examined and recorded; but, to begin with, I am not a specialist for nervous diseases; and, secondly, the nervous disturbances were in most cases of minor importance compared with the serious operations that had been performed on the patients. But, deficient as the histories are, they may still be available for calling the attention of others to the matter, who then from the beginning may observe similar cases more closely, or associate neurologists with them to investigate all involved questions more fully. These lines may also serve as a warning to the young men who usually are intrusted with the administration of anæsthetics, for, as we shall see later, the evil can in most cases be avoided by proper attention to the position of the patient during anæsthesia.

CASE I.—Mrs. R., aged forty-four years, Canadian, nullipara, was referred to me by Dr. R. W. Taylor. She had been suffering from menorrhagia for five years, and had been bleeding for six weeks when first seen. She was in a very anæmic condition. On February 17, 1893, I curetted her uterus, using ether as the anæsthetic, and Robb's leg-holder over the left shoulder. For the information of those who do not know this apparatus, I may add that it consists of a strong band of two layers of heavy muslin having in each end snaps that enter into iron rings sewn to the muslin. By this means the band is made to form a ring just above the strongly flexed knee, while the middle of the band goes in a slanting line behind the back and up over the left shoulder, which is padded with a folded towel or a layer of cotton.

Ether was administered by Dr. Leon F. Garrigues. The arms were flexed at the elbows and the hands rested on the sides of the face. The curetting stopped the bleeding effectually and permanently; that is to say, since then she has had normal monthly periods and was when last seen, some months ago, in good health.

When she recovered from the etherization her right arm, upon which there had been no kind of pressure, was lame. First the extensor side alone was affected, but later the flexor side was similarly implicated. She could not move the limb at all. The fingers were in a half-flexed

position, but could be passively extended. The whole extremity was somewhat swollen. Sensation was benumbed. Off and on she had some pain in the arm and the skin would become red in changing areas. Rubbing with spirit of camphor had no effect. Then faradization was employed daily, to which later was added massage. At the same time the system was built up with maltine, wine, iron, quinine, and strychnine. At the end of four months the arm and hand were yet a little weak. Then she went to the seashore, took baths, and returned at the end of six weeks perfectly well, both as to the paralysis and her general health.

CASE II.—Mrs. N., aged forty years, German, was seen by me in consultation with Dr. Fred. M. Bauer, transferred to St. Mark's Hospital, and operated on March 31, 1894. Ether was administered by Dr. Martin Schuh. The left tube and ovary, which were bound with fresh adhesions to the intestine, were freed and removed. In the right broad ligament was a hæmatoma reaching half-way up to the umbilicus. The coagulated blood was removed, an opening cut in the vaginal roof, and a T-shaped soft-rubber drainage-tube drawn up into the cavity in the broad ligament. The very brittle tissue was difficult to tie. The patient lost a good deal of blood, and the pulse became weak. A gauze drain was carried from the upper opening in the broad ligament out through the lower end of the incision in the abdominal wall. The patient made a good recovery.

It was discovered, we do not exactly know when, that her left arm was paralyzed. When she was out of danger in regard to her peritonitis and hæmatoma of the broad ligament the arm was treated daily with faradization. She left the hospital after a month, but came for some little time to continue the electrical treatment until she was well.

In this case the legs had been extended and no pressure had been exercised on the left shoulder.

CASE III.—Mrs. H., aged twenty-eight years, German. I performed double salpingo-oöphorectomy on her in St. Mark's Hospital on October 17, 1894. Ether was administered by Dr. Dann. The incision in the abdomen was just long enough to admit two fingers. There were no adhesions, and the inflamed and cystic ovaries were easily removed. The next day the whole left arm was found in a condition of semi-paralysis and the sensibility was much impaired. On the 29th—twelve days after operation—the arm was better but weak, and faradization was begun. She was discharged well, so far as the arm was concerned, on November 17th.

CASE IV.—Mrs. H., the same as Case III. The abdominal pain continuing, I removed her uterus by vaginal hysterectomy on January 21, 1895. Dr. Goldberg gave the ether. The patient did not lose much blood, but other difficulties caused the operation to last over two hours.

Three days elapsed before the patient complained of her leg. Then it was found that the whole left lower extremity was almost motionless, and that there was nearly complete insensibility of the area supplied by the crural nerve and also of that supplied by the sciatic nerve from the middle of the thigh down. There was also great tenderness at the seat of the crural nerve at the left groin, as well as of the great sciatic nerve, a little above the popliteal space, the first of which points corresponds to the place where the hip-joint is being strongly flexed and the latter to that where the bandage presses on the thigh while using

Robb's leg-holder. She was treated with faradization and soon got well.

CASE V.—Mrs. S., aged thirty-four years, German, always nervous, was subjected to vaginal hysterectomy by me, at St. Mark's Hospital, on October 21, 1895. Dr. Pfeuffer gave the ether. I used the clamp method, and had trouble in arresting a deep hemorrhage. The operation was tedious, and she lost much blood, so that she became nearly pulseless. When she came to, she complained of numbness of the right arm. She died of heart-failure the next morning. No autopsy.

The first to call attention to the paralysis sometimes following anæsthesia was Büdinger, assistant to the late Billroth's clinic in Vienna. He published in *Archiv für klinische Chirurgie*, Berlin, 1894, vol. xlvii. pp. 121–145, an article entitled "Ueber Lähmungen nach Chloroformnarkosen." He described nine cases, but says that by questioning the staff of other hospital-divisions he had found that these cases were not rare, but had so far not received any attention either from the surgeons or the neurologists.

As the subject is yet so new and little known in this country, I add a brief abstract of Büdinger's cases.

CASE VI. (I.)—A woman, aged twenty-nine years, was operated on for carcinoma of the pylorus. Duration of operation two and one-half hours. Immediately after awakening, the right arm, which had been held upward during the operation, was found completely paralyzed. The arm was now found extended, the forearm in supination, and the fingers slightly flexed. She had no power to exercise pressure. Sensibility and reflexes were normal. The left pupil was twice as large as the right, which reacted slowly. There was no vasomotor disturbance. She died eleven days after the operation. There was no macroscopical or microscopical change to be found in the brain, the spinal marrow, or the nerves, but the roots of the brachial plexus were not examined.

CASE VII. (II.)—Man, aged forty-four years. Extirpation of colon ascendens for carcinoma. Duration of operation one and one-quarter hours. The right arm was strongly extended in the shoulder-joint, and the elbow-joint was held at right-angles. Immediately after the operation there was complete paralysis of the arm and shoulder. The sensibility was diminished and the reflexes weakened. The patient died next day. No autopsy.

CASE VIII. (III.)—An explorative incision was made on a woman, aged forty-six years, suffering from carcinoma of liver and stomach. Duration of operation one-quarter hour. The left arm had been held flexed at right-angles at the elbow-joint and extended a little beyond a right angle at the shoulder-joint. During the night following the operation the left arm was found completely paralyzed. The patient lived seven weeks, and at the autopsy there was found softening of the brain.

CASE IX. (IV.)—On a man, aged twenty-four years, part of the intestine was resected on account of perityphlitis. Duration of operation two and one-half hours. The left arm was only extended a little beyond a right-angle during the anæsthesia, but when the patient awoke there was great weakness of the whole arm. The motions were

slow and imperfect. The patient died during the night. At the autopsy the brain was found very anæmic and somewhat moist.

CASE X. (V.)—Supravaginal amputation of uterus for a myoma. Duration of operation two hours. Both arms were tied to the upper part of the table, so that they formed angles of 120° with the thorax. The forearms were supinated. The next day the right arm was found paralyzed. All movements of the forearm were abolished ; in the fingers slight flexion was possible. The shoulder could only be elevated very little. The sensibility was much diminished. Faradization. The limb was yet weak three or four months after the operation, but at the end of six months there was complete recovery and no atrophy.

CASE XI. (VI.)—A woman, aged thirty-one years, was operated on for a kidney-tumor. She was lying on the left side. The right arm was paralyzed and numb. Twelve weeks after the operation movements were yet slow and uncertain.

CASE XII. (VII.)—Woman, aged forty-three years. Hysterectomy for myoma. Arms held as in Case X. Complete paralysis of right arm. After six months the movements were yet slow and weak.

CASE XIII. (VIII.)—Female, aged forty-three years. Oöphorectomy for myoma. Duration of operation one and one-quarter hours. Arms held as in Cases X. and XII. The following day the right shoulder, arm, and forearm were found paralyzed. There was pain on pressure above the clavicle, not on the brachial plexus in the axilla. Hand and fingers were normal. The sensibility was diminished on the forearm. She improved, but the final result is not known.

CASE XIV. (IX.)—Woman, aged thirty-eight years. Resection of pylorus. Immediately after the operation the right arm was found paralyzed and insensitive from the elbow to the finger-tips. The right eye was the seat of a nearly complete amaurosis, which soon got better, but during a whole year she had double vision. A few weeks after the operation the right shoulder became painfully sensitive. In spite of electric treatment it took more than a year before the hand and fingers became somewhat movable and regained sensibility. Eighteen months after the operation the right palpebral fissure was smaller and the right pupil narrower than the left. There was some atrophy of the muscles. Two and one-half years after the operation she was nearly well.

Placzek,[1] of Berlin, has published the case of a woman upon whom laparotomy was performed for salpingitis. Shortly after awakening she complained of pain in the left arm. Next the muscles of the thumb and the interossei diminished in size. There was partial loss of electrical excitability, with the reaction characteristic of degeneration, diminished nervous irritability, and slow muscular contraction.

Franke,[2] of Elberfeld, had a case of a girl, nineteen years of age, who was laparotomized. Immediately after she came out of the anæsthesia the right arm was found completely paralyzed. There was loss of sensibility of the outer surface of the arms. The faradic reaction was normal. At the end of three months the paralysis remained and only a few movements were possible.

Vautrin,[3] of Nancy, has had three cases, two of paralysis of the

[1] La Médecine moderne, Paris, 1895, p. 198.
[2] La Tribune Médicale, July 17, 1895.
[3] Paralysies Chloroformiques. Médecine moderne, August 31, 1895, vol. vi. p. 572.

shoulder, and one of the face. The operations were performed for a small papilloma of the tongue, hydrocele, and a tumor of the breast. One of the patients took only very little chloroform.

In the discussion on Vautrin's paper Gross said there had been a fatal case after herniotomy in Strasburg. Hemiplegia developed in the evening. The autopsy showed a clot in the brain. In another fatal case there were found cerebral emboli.

Krumm,[1] of Worms, contributed four new cases from the clinic to which he is attached, and has written a monograph on the subject. Büdinger mentions three other cases of brachial paralysis happening after operation performed by Bardenheuer, Thelen, and Bernhardt.

In regard to the etiology of anæsthesia-paralysis, the cases may be divided into those of peripheral and those of central origin, the former of which are much more common than the latter. It is evident that the choice of the drug used as anæsthetic is without importance. In the French cases chloroform was used, in those occurring at Vienna either chloroform or A.-C.-E. mixture, and in my own ether alone.

While many of the cases have occurred after protracted operations, others, such as Büdinger's Case III., one of Vautrin's, and my own Cases I. and III., were observed after short and easy operations.

Loss of blood before or during the operation may be of some importance as a predisposing cause. Children and emaciated persons are more liable to be injured. But the real exciting-cause in the cases of peripheral origin is pressure. It appears from the preceding histories that the paralysis has been observed in the extremities, the face, and an entire half of the body. That of the arm is the most common. Büdinger has shown experimentally that this paralysis is due to pressure occurring between the clavicle and the anterior surface of the first rib, and bearing on the brachial plexus where it emerges between the scalenus anticus and medius. The pressure takes place when the arm is elevated alongside of the head, as often done during laparotomies performed in Trendelenburg's position, or brought out from the body as in amputation of the breast. Krumm found the pressure to take place between the clavicle and the transverse process of the fifth and sixth cervical vertebræ. Braun thinks that it is the head of the humerus that presses on the brachial plexus, just as the pulsation in the radial artery can be arrested by drawing the arm up.

Kron has shown on the cadaver that by elevating the arm backward and outward and simultaneously rotating it outward the median nerve is being stretched over the head of the humerus, and the same happens to the ulnar nerve when the forearm is flexed and strongly supinated. But there is hardly any doubt that in most cases of brachial paralysis

[1] Volkmann's Klinische Vorträge, No. 139. Leipzig, 1895. Ueber Narkosenlähmungen.

the pressure takes place as described by Büdinger between the collar-bone and the first rib.

The plexus is especially exposed to injury by this pressure if the nerves are stretched, which takes place if the head is drawn to the side opposite to that on which the arm is being elevated, or if the head is allowed to fall back.

Among my cases there are only two (Cases I. and II.) of complete paralysis, and that was seated in the right arm in Case I. and in the left arm in Case II. In Case III. the left arm was in a condition of paresis, and in Case V. a similar state had taken place in the right arm. For all these cases I adopt the explanation offered by Büdinger of more or less complete compression of the brachial plexus between the clavicle and the first rib. In Case IV. the left leg was the site of the affection, which is easily explained by the pressure exerted on the crural nerve at the inguinal fold and on the sciatic nerve at the posterior surface of the thigh just above the knee, in consequence of the cramped position in which the body is held by Robb's leg-holder.

In cases of pressure on the brachial plexus the upper roots—fifth and sixth cervical nerves—are more liable to be caught between the bones than the lower—seventh and eighth cervical and first dorsal. In such cases the paralysis attacks the deltoid, the brachialis anticus, the biceps, and the supinator longus muscles, while the other muscles of the extremity may escape. On the other hand, the muscles of the shoulder are implicated in some cases, their nerves coming from the same plexus.

If the lower roots are compressed too, the forearm and the hand are more or less paralyzed; but the less degree of pressure exercised on the lower roots explains that the paralysis is often less pronounced in these parts, and that motility returns sooner in the fingers than in those parts of the extremity which are situated higher up.

In a few cases there were disturbances in the eye: the palpebral fissure was diminished in size; the pupil was contracted; there was amaurosis, and later double vision. These ocular disturbances are, according to clinical and experimental studies, due to a lesion of the communicating branch from the first dorsal nerve, which is probably due to stretching or to neuritis.

There is also more or less disturbance in the sensory sphere. There may be complete insensibility or numbness. Sometimes there is spontaneous pain or tenderness on pressure. Sensitive points may develop in the course of nerves. They are attributed to chronic descending neuritis or myositis. In one of Büdinger's cases such a sore point could be felt on the deltoid two years and a half after the operation. The electric excitability is diminished, and the muscles are slow to contract.

When the upper roots alone are compressed there are less disturb-

ances in sensation. In the lighter cases of plexus-paralysis they are therefore rarely present; but in compression of the lower roots or when the whole plexus is involved, sensation is annihilated or obscured in the domain of the cutaneous branches of the ulnar, the internal cutaneous, the musculo-cutaneous, the median, and the radial nerves.

It has been noticed that even when the muscles innervated by the circumflex nerve—the deltoid and teres minor—are paralyzed the corresponding skin retains its sensibility. In my first case there were swelling of the affected arm and appearance and disappearance of redness on changing areas of the skin, showing implication of the vasomotor nerves. In most cases the abnormalities in the motor or sensory sphere appear immediately; in others there is a gradual development. In some cases the paralysis has led to atrophy, but this seems more an exception than a rule.

Anæsthesia-paralysis of central origin is much rarer than that of peripheral origin, and is rather obscure. It may be due to cerebral apoplexy or emboli, either of which would produce ischæmia in the surroundings and secondary softening of the brain. People who oppose a violent resistance during the anæsthetization, and old people with arteriosclerosis, would be more liable to such occurrences. Or it may be due to a primary softening of the brain (see Case VIII.), directly brought on by the influence of the anæsthetic on the nerve-tissue, analogous to the acute nephritis often observed after long operations, which latter, however, soon disappears, and to the acute parenchymatous degeneration that has been found in the muscles, the heart, and the liver.

The paralysis of central origin appears as hemiplegia or hemiparesis; but it is not unlikely that so-called chloroform- or ether-death in some cases really is due to apoplexy. In this connection I may mention that one of my patients, an old woman, upon whom I operated for prolapse of the uterus, and who was under the influence of chloroform one hour, was seized with acute mania. The later developments of this case are unknown to me.

The differential diagnosis between central and peripheral cases is, as a rule, not difficult. In the peripheral cases the lameness corresponds to one or more nerves upon which undue pressure has been exercised, or to the brachial plexus. There appear sometimes hyperæsthetic points in the course of a nerve. The electric irritability is diminished, and the muscles contract slowly.

The prognosis is in the lighter cases good, both as to complete recovery and the time needed for a cure; in the more pronounced cases of plexus-paralysis it seems also to be good as to final result, but it may take many months or even years before a cure is effected. In the central cases the prognosis is, of course, much more serious and doubtful.

As to treatment, prophylaxis should first attract our most serious atten-

tion. Pressure on special nerves should be avoided, and the arms should never be raised above the head, but, so far as possible, rest in an easily flexed position on the chest. In using leg-holders the parts exposed to special pressure should be carefully padded with cotton-batting. The head should be supported on a pillow, and, if the patient vomits and the arm is raised, the head should be bent toward the arm, and not away from it. As to paralysis of central origin, we can hardly take any prophylactic measures beyond abstaining as far as possible from operating on very old persons, and abridging the duration of the anæsthesia as much as possible. In this respect it is often preferable, if several operations are needed, to operate in two sittings rather than to keep the patient too long under ether.

In regard to curative treatment electricity occupies the first place; but since it has been found that its application shortly after the operation is very painful, it is advisable to wait about a week before having recourse to it. All my cases have responded nicely to faradization Krumm recommends to use galvanism and place the cathode on the point of lesion, and later to use labile and stabile electrization both above and beneath the seat of the lesion.

Besides electricity, massage and hydrotherapy are undoubtedly of some value. Among drugs strychnine is the most important, and may be given together with iron, quinine, arsenic, extract of red marrow, and a nourishing diet.

A CASE OF DISTORTION OF THE AORTA IN POTT'S DISEASE.

By Thomas Dwight, M.D., LL.D.,

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That the aorta is liable to distortion in Pott's disease is well known to specialists; but, if I am not mistaken, the fact is not generally familiar. It is partly for this reason that I venture to publish the following observation, and partly because I am not acquainted with any account of an equal distortion. Leon Bouchacourt[1] has recently published an account of a much less striking deformity in a child. I am indebted to him for the statement that the *Thèse de doctorat* of Tournissont, in 1887, inspired by Lannelongue, contains the results of previous works. It appears that the deviations of the aorta in Pott's disease are of five types. In the first, the most common one, the aorta simply follows the bend in the spine, presenting a sudden bend, making a V-shaped angle, open in front. In the second type the vessel is bent forward by

[1] Revue d'Orthopédie, Mai, 1895.

an abscess behind it, assuming the form of a C, open behind. In the third type the aorta is thrown to one side, making a C placed laterally. The fourth type, much more uncommon, shows a double lateral curve, so that it represents an S. The fifth type is a combination of more or fewer of the preceding types, being a series of complicated curves. So much for mere deviation. The following passage is from Hoffa :[1] " The aorta and vena cava can have their course changed   .   .   .   The folding of the vessels can lead to a considerable reduction of their lumen sufficient to cause an arterial anæmia of the parts below, or a venous congestion of the same. Vascular murmurs are heard when there is a marked narrowing. Lannelongue further points out that a dilatation of the aorta is likely to occur above the bent point and a narrowing below it. He would thus account for sudden and temporary paralyses."

The specimen about to be described came from the body of a white man, fifty-one years old, dissected during the past winter at the Harvard Medical School. The body was thin and ill-nourished. The deformity was very great, presenting a very sharp prominence in the middle of the back. On seeing the subject before dissection, I determined to study the relations of the œsophagus, but, unfortunately, forgot all about it under stress of other work, until I was called to see a remarkable arrangement of the aorta. The subject had by that time been thoroughly gutted, so that nothing else was left to study. I was told that a large abscess had been found in the left hypochondrium.

The deformity of the spine was a very great one, situated in the lower half of the thoracic and practically the whole of the lumbar regions. The point of the bend was at the last thoracic spinous process. The angle made by lines drawn through the centres of the vertebral bodies would not have been far from 35°. The length of the spine from the top of the odontoid to the coccyx in a straight line was 40.5 cm., to the promontory 23 cm. The average length to the promontory in the male spine is probably from 60 to 63 cm. I have found this measurement, in fifty of fifty-six male spines, to range from 57 to 66 cm.[2] This shows how great was the shortening. The length of the cervical region was 12.6 cm. (7 mm. below the average), and that of the sacrum and coccyx 17.5 cm., both being measured along the curves. The cervical vertebræ were normal, except for a slight twist to the right, which, perhaps, was not pathological. The same may be said of the bodies of the four upper thoracic vertebræ, and perhaps of the top of the next one. The lower part of the fifth is fused with the sixth, and thence the spine is one piece to the end. There seem to be some remnants of an intervertebral disk below the last lumbar, but they are slight, and the bone is certainly co-

[1] Lehrbuch der Orthopädische Chirurgie, 1891.

[2] Methods of Estimating the Height from Parts of the Skeleton. Medical Record, September 8, 1894.
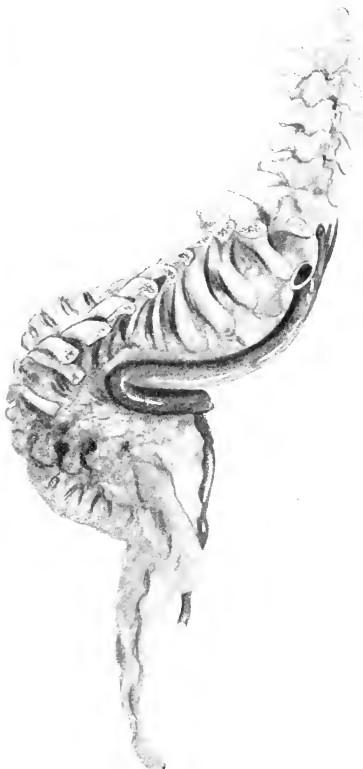
ossified with the sacrum. Owing chiefly to the severity of the lesion, but in part to the necessity of making a ligamentous preparation in order to preserve the aorta, the detail of the condition of the bodies of most of the vertebræ could not be ascertained. The body of the seventh

FIG. 1.   FIG. 2.

Front view.   View from the right.
The iliacs are hanging loose.

thoracic lay on that of the third or fourth lumbar, joined to it by bone. The intervening ones were indistinguishably fused into one mass, from the sides of which the ribs emerged. The upper lumbar and lower thoracic were deviated to the right, leaving a hollow, probably occupied

by pus. There were but very slight indications of a spiral twist. Seen from behind, the spinous processes were all distinct and without marked lateral deviation. The ribs, excepting the last one on each side, were very close together; those of the right, especially, being directed very strongly upward. The transverse processes in the upper half of the thoracic region were turned far backward so as to make a deep gutter on either side of the spine—additional evidence of the early occurrence of the disease. The sacrum was very long and flat. The flatness, indeed, is probably the cause of the length. There were six sacral vertebræ, of which the first was rather transitional. The coccyx was coössified.

The aorta belongs to the fifth of the above-mentioned types; or, perhaps, might be compared to an S lying on its side, with the ends bent strongly back so as to fit around the prominence of the spine.

The general course of the aorta was as follows: the termination of the arch apparently began to rest on the spine at the middle of the body of the third thoracic vertebra, whence it descended in a long sweep, first to the left for a short distance, and then without sudden change of direction obliquely downward across the vertebral column to the head of the right eighth rib. This may be called the first curve. It then turned very sharply to make a second, a horizontal curve, still resting on the upper half of the bent spine, running forward, across, and backward, with a slight downward tendency, round and back to the left. The beginning of the second curve is close under and almost parallel to the latter part of the first. The third curve began with another sudden change of direction, and ran obliquely downward and forward along the fourth and fifth lumbars to the median line, where it divided into the iliacs opposite the highest point of the promontory. The length of the first curve, measured along the middle of the vessel, beginning at the level of the lower border of the left subclavian, is 12.5 cm.; that of the second, 11 cm.; and that of the third to the bifurcation, 8 cm., making a total of 31.5 cm. This is probably but a little less, some 3 cm., than the average length. The aorta is on the mounted preparation of small diameter; unfortunately it was not measured while fresh, but to the best of my recollection it was notably small. The third curve is of decidedly smaller diameter than the parts above it. There is no tendency to a dilatation above the first bend, nor to a constriction below it. At the second the difference in size is more marked. It would not appear that there was any great danger of a sudden interruption of the circulation in spite of the sharpness of the changes of direction. It seems probable that the aorta continued to grow in length after the beginning of the disease of the spine.

Unsatisfactory as this description may be without clinical observations, it is perhaps worth giving on account of the rarity of the specimen.

SOME OF THE DIFFICULTIES OF CLIMATOTHERAPY.[1]

By James B. Walker, M.D.,
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THE trend of medical investigation and of medical energy to-day is in the direction of therapy. For a decade all the activities of the profession seemed to gather about surgery. Trephining, laparotomy, hysterectomy, and their ilk filled our medical journals, almost to the exclusion of all else. The rapid pace could not be continuous, however, and conservatism is calling a halt in some directions at least. Technique alone seems to be left for discussion in surgical matters, apart from the disputes which ever arise between the heroic operator and his more conservative and usually older brother. Therapy is now in the van. The wholesale discovery and presentation of new and active pharmaceutical agents, whose countless additions to our armamentarium are almost bewildering, have added unto them animal-extracts ; and nuclein, bone-marrow, various antitoxins, thyroid and other gland extractions fill our societies with discussion, our journals with reading-matter, and the daily newspapers with sensational pabulum. Therapy is, to the medical man, what operations are to the surgeon—the means of relief from diseased conditions. This must ever be the ultimate object of all medical investigation. Koch's bacillus might as well have remained an unknown factor in disease so far as the patient, its host, goes, or so far as his physician is concerned, except as it may illumine the way to its own destruction.

The activity in therapy is not alone expressed in the remedial agents which the laboratories are evolving. More and more is the profession turning toward that *facile princeps*, preventive medicine, and to those so-called " natural agencies " which are so abundantly provided for our invigoration when well and recuperation when sick.

Among these natural agencies stands prominently in the foreground, climate ; and climatotherapy is not only claiming more and more serious attention, but is deserving of vastly more than it has thus far succeeded in obtaining.

Ever since our progenitors left the ancestral cradle on the Iranian plateau and scattered to the " four winds of heaven," the race has been battling and dying, growing stronger and weaker, in its efforts at acclimatization. As new countries were conquered and occupied as permanent dwelling-places, the aborigines being annihilated or assimilated, this attempt to accommodate itself to its ever new and mostly varying environment has occupied not a little of the energy of the race, as the restless spirit of enterprise has driven it East, West, North, or South.

That the efforts at acclimatization have been successfully accomplished for the race, the "survival of the fittest," under all conditions of environment, bears abundant testimony; but that, in the effort, the individual has been abundantly sacrificed, the vast hordes that have succumbed to the various local causes of disease and death bear equal witness. Into the ranks arrive constantly new individuals in every community, who, from inherent or acquired vulnerability, find it impossible to live at peace with their environment; and, as their vulnerability exhibits itself in the form of actual disease, the question must arise, in the management of such an organism, Is it possible so to fortify him as to lessen his vulnerability and establish his resistance and enable him to battle successfully with his foe in his present environment? If not, if he, as an individual, cannot accommodate himself to his environment, can an environment be furnished which, accommodating itself to his requirements, will aid him in the struggle?

Around this question centre the efforts of the climatotherapist, and in the settlement or solution of it he finds certain difficulties, some of which I shall endeavor to place before you, in the hope that it will stimulate us to greater efforts to elucidate and simplify this somewhat complex problem, which is the especial object of our Association.

The chief difficulties which the climatotherapist encounters may perhaps be classed under the following heads:

1. The uncertainty of the composition of the agent.
2. Lack of sufficient data concerning many American stations.
3. Difficulty of choice for the individual case.
4. Lack of general information as to the elements of climate affecting health and the consequent lack of ability wisely to use the agent.

THE UNCERTAINTY OF THE COMPOSITION OF THE AGENT. If each health-resort had its climatic elements in fairly definite quantity, barring such variations as must be incident to changing seasons, climatotherapy would constitute one of the simplest and plainest of lessons. One could choose, by latitude or isothermal line, the amount of cold desired, and altitude and insular or inland location would do the rest; but, unfortunately, such is not the state of the case. "The wind bloweth where it listeth" now as in "ye olden time," and at least along seaboards its direction constantly modifies temperature, humidity, and barometric pressure. So far as seaboard-resorts are concerned, therefore, only an approximate estimate of the climate to be anticipated can be made; so that our prescription may be only partially filled, and substitutions, much more serious than those which some pharmacists are said to make, may occur, so completely altering the effect as even to jeopardize life. Each of us can supply incidents from our own experience, some serious, some ludicrous, illustrative of misplaced confidence in climate. An intimate friend of mine sent a phthisical patient to

Marietta, Georgia, to remain during the winter months. She and her attendant arrived there the night before that frost, that " chilling frost " which extended even to Florida, with destructive effect on the orange-groves. The patient did not wait for further developments, but speedily returned North, where provision is made beforehand for that kind of weather ; and thereafter had serious doubts about the wisdom of her medical adviser as to matters climatic. Only this winter I sent a con-valescent to a noted Southern resort whose moderate altitude has been ofttimes vaunted as entitling it to be the " all-the-year-around " favorite. I sent her there that she might have more days of sunshine to ride or drive and otherwise recoup her vigor. A few days later, when the vicinity of Philadelphia was mild, pleasant, and open, I received a letter stating that, owing to the snow, they had been unable to enjoy as much out-of-door life as was desirable. They hoped, however, for better things, and, waiting, got them. When even Colorado Springs, that paradise for the phthisical, with Pike's Peak ever at her elbow to freeze any excess of moisture from her diathermic atmosphere, may lie " for seventeen successive days under a canopy of clouds," without a ray of sunshine to idealize her usually unexcelled " invalid's day," one can readily see that climatotherapy presents some problems not easy of solu-tion. This difficulty, however, chiefly affects, to a serious extent, only those cases in which short doses of climate are prescribed. Taking the season through, a moderately fair estimate of the climate to be expected may be made ; and this, after all, affects most of those cases in which it seems to be more particularly an essential element in the treatment. A convalescent sent for a few weeks to hasten recuperation to any resort, and especially seaboard-resorts, may stumble upon exceptional weather and be worse off than if he had remained at home ; but the phthisical or the rheumatic who should go for a longer time, or for a permanent resi-dence, will usually find, in the season through, that fair average or mean climatic condition which he seeks.

LACK OF SUFFICIENT DATA CONCERNING MANY, IF NOT ALL, AMERICAN STATIONS. Much has undoubtedly been already accom-plished in this direction. The researches of Solly, Fisk, Denison, Ruedi, von Ruck, Orme, Remondini, and others have given us insight into this subject concerning some of our most noted and, perhaps, the most im-portant stations for the climatic treatment of consumptives ; but many others have been but imperfectly presented to the profession, and most of those of which we have records have furnished no comparative data, but chiefly the facts concerning one locality alone, giving us no compre-hensive view of our climatic stations as a whole, as has been done for European stations by men of wide experience with the different localities.

Agencies are, however, at work in our own country which tend to modify climatic conditions and which necessitate continuous records in

order to enable us to prescribe climate wisely. The removal of large tracts of timber, the irrigation of extensive, almost deserted wastes, and the consequent abundant vegetation resulting, may vary greatly the humidity of a locality and modify decidedly the climatic conditions. Increasing population, producing towns and even cities in a few years, may modify, for better or worse, the pre-existing conditions. Railway facilities and desirable hotels and boarding-houses are annually bringing new resorts for our study, and the absence of the same place many otherwise most desirable and beneficial localities under ban. Climate, without good food and shelter from vicissitudes, counts for nothing to the chronic invalid in his battle with a mortal foe. The more important health-resorts in Europe have not this difficulty to contend with. Their established reputations, with ease of access and thorough adaptation to all of the needs, physical and social, of the invalid, remove this difficulty from the problem. Then, again, their climate is usually more stable, less subject to marked variations, owing to their altitude, like San Moritz and other Alpine stations; their background of mountain-range, like places along the Riviera, or their insular position, like Madeira. Time, with the devotion of the medical profession, has done for their resorts what it will do for those of this country. Meanwhile we must wait, and work while we wait. Our own Association, besides gathering from its widely scattered membership facts concerning the various stations throughout the country, has an energetic and conscientious committee gathering data which must greatly advance our knowledge of the climatic features at our disposal and place on a more definite basis the absolute facts concerning the different resorts, bared of the tinsel and glitter of hyper-enthusiasts. Professor Moore and Dr. Phillips, of the Government Weather Bureau, have begun, in their monthly issue of a pamphlet on *Climate and Health*, a work which will no doubt be elaborated as time goes on, and prove of incalculable benefit to the climatologist. This work exhibits the climatic conditions for the same period of time of almost a hundred stations scattered over the United States, giving their barometric pressure, temperature, humidity, rainfall, number of days clear, partly cloudy, cloudy and rainy, and the direction and average daily movement of the wind. It also gives reports from about one hundred and seventy-five stations as to the prevailing sickness in these different localities and their surroundings, which will undoubtedly prove of much benefit to the statistician of the causes of disease and the climatic conditions favoring their origin, spread, and mortality.

THE DIFFICULTY OF CHOICE FOR THE INDIVIDUAL CASE. This constitutes one of the most decided difficulties of the whole subject. It is, at this time, one of the most important points in climatotherapy. It applies alike to our European *confrères* and to ourselves. All therapeusis, however, presents the same difficulty. Remedial agencies of any

sort applied to apparently similar cases do not invariably bring about the same result. This is especially true of climates. Of two patients, apparently about equally affected with phthisis, and, so far as we can judge, equally promising under favorable conditions, sent to the same resort and subjected to the same care, one will improve—perhaps recover, and the other may continue uninterruptedly to grow worse, or, improving at first, may later rapidly or slowly decline. Williams tells us of twenty selected cases sent by the Brompton Hospital to Madeira for one winter. Only three improved, one died, and the rest returned to England worse than when they started ; and yet these cases were carefully selected by the hospital staff as most likely to benefit by that climate.

Undoubtedly familiarity with the agent enables one to choose the suitable station with fewer errors than they can do who are less familiar with climatic effects. In my opinion the best elucidation yet presented on climatotherapy is to be found in the work entitled *Aërotherapy*, by C. Theodore Williams, published in 1894. He lays down propositions and conclusions from his most extensive experience which should greatly help the profession. Although his experience has chiefly been with what to us are foreign stations, he has had some acquaintance with a few of the more important of those of our own country, both through patients whom he has sent and also through a personal visit thereto. The principle that he establishes for the foreign resorts may serve as a foundation for a more rational climatotherapy with us, as the same or markedly similar climates to those which he has chiefly used are to be found within our borders.

LACK OF GENERAL INFORMATION AS TO THE ELEMENTS OF THE CLIMATE AFFECTING HEALTH, AND THE CONSEQUENT LACK OF ABILITY WISELY TO USE THE AGENT. The question paramount in most minds about to employ climate in a given case is, " What is the best climate for phthisical patients ? " The question should ever be, " What is the best climate for *this* phthisical patient ? " *There is no antibacillary climate habitable.* Climate is or may be a factor to aid in resisting disease by recuperating energies or by lessening causes of aggravation. It is a complex factor, variously compounded. It should be prescribed, as any other remedy is prescribed, with knowledge of its constituent elements and with forethought as to the effects of the especial combination and the especial case at hand. The four elements of climate chiefly affecting health are : temperature ; humidity, including sunshine ; air-movement or wind ; and atmospheric pressure, including altitude. As nearly as possible in a given case one should ever choose that place whose possession of these constituents in appropriate combination seems best calculated to induce a favorable result. The principal modifying factors of these constituents are due to : 1. Distance from the equator. 2. Height above sea-level. 3. Distance from the sea. 4. Pregvailin winds. 5. Character of the soil.

It must be apparent that, in our vast extent of continent, bathed on its eastern and western borders by the principal oceans of the earth, extending through the breadth of the temperate zone, and possessed of mountains and plateaus so located as to insure to our patients altitude with such combination of desirable qualities as are unequalled even in the best of the Alpine stations, I repeat, with such factors for modifying climate we should be, and are, able to find within our own borders and on the islands adjacent all varieties from which to make selection. Our high-altitude stations are considered by most authorities as superior to those of the Engadine in many respects, one of which is the absence of wet soil from the melting of snow, it seeming to dry away, owing to the amount of sunshine and the character of the soil. The Engadine at the time of snow-melting, in the spring, is unfitted for consumptives, though they may return later with benefit. One objectionable feature in our Colorado climate is the dust, which makes it less desirable for irritative mucous membranes than is the Engadine, which, during the winter, is snow covered. Apart from this feature, however, Colorado and New Mexico, running into Texas, present the climate *par excellence* for all cases of phthisis in which altitude is not contraindicated.

Dr. Holland, the English-speaking physician at San Moritz, agrees in the main with C. Theodore Williams and most of our own authorities as to the advantages and contraindications of altitude. The latter writer has formulated the following as his experience of the influence of altitude in phthisical cases :

" 1. Enlargement of the thorax, unless opposed by fibrosis or by extensive adhesions.

" 2. Males and females seem to do equally well, and profit most between the ages of twenty and thirty, males over thirty and females under twenty being benefited least.

" 3. The climate is especially beneficial in hemorrhagic cases. (Holland considers that hæmoptysis is not a barrier to high-altitude treatment, so that this formerly supposed contraindication is losing supporters abroad as well as with us.) In hereditary cases it seems to exercise a distinctly counteracting influence on the development of phthisis.

" 4. It is most effective in cases of recent date, though of utility in those of long standing. To insure benefit, at least six months, and, preferably, two years' stay, is desirable.

" 5. It produces undoubted improvement in 75 per cent. of phthisis generally, and arrests the tuberculous process completely in 43 per cent."

He considers that its influence is best shown in consolidation, in which improvement may be looked for in 87 per cent. and arrest in 57 per cent.

In excavations great improvement occurs in 55 per cent. and arrest in 16 per cent., so far as his cases may be taken as a measure. The *general* improvement of which he speaks consists in improved digestion

and assimilation, gain of weight, and return of normal functions, and of color, and of muscular, respiratory, and circulatory power, at the same time that the evidences of disease cease to manifest themselves.

This list of *contraindications* will serve as a basis for decision, and probably applies with equal force to all high-altitude climates.

" 1. Phthisis with double cavities.

" 2. Fibroid phthisis and all other conditions in which the healthy pulmonary area hardly suffices for respiratory purposes at sea-level.

" 3. Catarrhal and laryngeal phthisis. (Holland would include cases with so-called ' gastrointestinal catarrh.')

" 4. Acute phthisis of all kinds, especially when associated with nervous irritability.

" 5. Phthisis with pyrexia.

" 6. Emphysema.

" 7. Chronic bronchitis and bronchiectasis.

" Organic disease of the heart and great vessels. (Holland considers *obstructive* disease to be an absolute contraindication ; but, from his experience, if the pulmonary condition warrants the prescription of high altitude for its treatment, *regurgitant* lesion of the heart is no barrier.)

" 8. Diseases of the liver and kidneys, including all forms of albuminuria.

" 9. Disease of the brain and spinal cord.

" 10. Anæmia. (Holland, on the other hand, has found that anæmia cases, as a rule, do well, especially in summer ; whereas the scrofulous do best in winter. This applies especially to children, who should arrive early in the season, before November, Solly's experience supports that of Holland as to the benefit of high altitudes in anæmia.)

" 11. Patients too feeble to take exercise.

" 12. Patients who have degenerated organs from long residence in tropical countries."

In considering the effects of altitude, Williams does not forget a most important adjunct to altitude, to which his patients were subjected, viz., the careful medical supervision, as practised in the Alpine stations where most of his cases were sent, and where supervision is both easier and more complete than in the Riviera and most of the southern resorts. His admission on this score corresponds with the repeated and unanimous advice of those familiar with our own high-altitude stations —that patients sent to such places should not be left to their own devices in using so potent a remedy, but should be referred to some competent physician, whose familiarity with the effects of altitude may help the patient to avoid deteriorating agencies and to obtain the best results possible by a careful supervision of his life and habits.

Dr. Solly, in a paper read before the American Public Health Association in Denver, 1895, deals with the hæmatogenetic results from altitude

in a thoroughly scientific manner. He quotes from a paper by Dr. Egger, before the Congress at Wiesbaden, 1893, to show the resulting increase in red corpuscles and in the total amount of hæmoglobin in the blood. In other words, the blood, as an oxygen-bearer, is decidedly magnified. Solly concludes, from these studies, which have been verified by studies by Koeppe and Wolf, that we have good reason to believe that there is developed in life at high altitudes a greater power of resistance to the attempted lodgement of germs within the body by means of the increased germicidal character of the more highly oxygenated blood and through the more perfect working of the heart and lungs.

It must be remembered that our resorts at high altitude furnish us not only with the especial stimuli to the respiratory and circulatory functions which attenuated air furnishes, but also less humidity, with its effects on sunshine, and increased power of the sun's rays as well as the roborant effect of cold.

Dr. Ruedi, personally familiar with both the Engadine and the Colorado climate, in a paper read before this Association in Philadelphia, in 1893, giving an elaborate comparison of the two localities, concludes that " in barometric variation, humidity, sunshine, and temperature, Colorado, New Mexio, and parts of Arizona have, in their mountains, natural advantages and climatic conditions which equal or surpass the best European health-resorts of this character."

Cases of phthisis suitable for transplanting climatically, but unsuited for altitude, may find relief in the warm and moist climates of sea-voyages. Irritative cases with bronchial or laryngeal catarrh are especially benefited, as also are cases in which a neurosis complicates the attack. Insular localities, like Jamaica or the Bermudas, may do for us what Madeira serves for the Europeans ; and, with its mountain-range, Jamaica gives an opportunity for a more decided choice and variety than most islands furnish. Its benefits for the phthisical were well presented at the last Pan-American Congress, in the Section on Climate, by Dr. Wolford Nelson, of New York ; Dr. James Henry Clark and Dr. James Cecil Phillipps, of Jamaica.

Southern California furnishes a warm climate with less humidity than a sea-voyage, and a varying humidity as the immediate seaboard or higher and drier points inland are chosen. The station is probably superior to the Riviera, with a somewhat similar climate.

It may be, however, that the continued experience of Trudeau, in the Adirondacks ; Bowditch, at Chelsea ; von Ruck, at Asheville, and others, will show that the sanatorium treatment of phthisis, with complete supervision and explicit personal care adapted to the particular case, gives as good results as the climatic, and that the future will not consign the incipient phthisical to a life of exile from home and friends. We await developments of what have already given promising results.

REVIEWS.

The appearance of an extensive work on medicine by English authors is an event of more than ordinary interest. For years a notable activity has been shown in England in many lines of pathological research, but without being reflected in current works on general pathology or medicine to a noticeable extent. The present work represents specialization carried to an unusual degree. More than forty names appear in the list of authors, all but two of whom are British. In some instances two, four, or even five writers have been assigned to the preparation of various parts of single articles. That differences of view, sometimes diametrical, appear, is to be expected under the circumstances. We do not consider this a disadvantage, though it necessitates a comparison of different parts in order to acquire the correct idea.

The volume is introduced by the editor in a chapter of brief length, but great interest. If we become impatient of the unnecessary explanation regarding the word system—who now thinks of using it in the sense criticised?—we are more than repaid by the sound and sane remarks on method, disease, terminology, and other topics.

The first half of the book is devoted to the Prolegomena. Many of the articles here are useful for reference, and others may with profit be read for general information. Some are of great excellence. They are necessarily short, but most of them are quite free from the air of incompleteness so often apparent in articles of theoretic interest when prepared especially for practising physicians. The articles of Dr. Billings on Medical Statistics and Dr. Beddoes on Anthropology and Medicine may be cited as examples. The chapter on Inflammation by Dr. Adami, longer than the others, though kept within unusual limits, is one of the most luminous ever written on that subject. Comparative pathology furnishes the point of view, but the author has brought to his task a practical knowledge of the facts, a grasp of previous observations and views, a judicious use of material, and a power of exposition that combine to form a chapter every student of medicine should read. The article on the General Pathology of New Growths, by Mr. Shattock and Mr. Ballance, is an authoritative and succinct review of the present condition of that obscure subject. Lack of space forbids quotation from the purely pathological part of this article, but the remarks on treatment deserve to have special attention called to them. After mentioning various methods of treatment experimentally tested by the authors, they say : " Up to the present the only hope has lain in early

removal before the infective elements of the tumor have been widely transported into the surrounding tissues or to distant parts of the body. The most successful surgeon is he who, knowing the pathology of the disease, appreciates the value of free and careful excisions. The incisions must be planned to pass through parts believed to be healthy; no knife which has been infected with the juice of the tumor must be used for the division of healthy tissues, lest the seeds of recurrence be sown along the fresh-cut surfaces; and not only lymphatic glands must be removed, but lymphatic vessels. In certain localities the operation for cancer conducted on these principles may permanently rid the patient of the disease. Excision of cancer of the lip may be completely successful; so, in a certain percentage, is that of mammary carcinoma; whilst the free removal of the rectum is followed by better results as regards respite from recurrence than that of any other part."

Dr. J. K. Mitchell has an article on Massage which contains all that should be known on that subject, without falling into the error of so many writers who try to teach from books the art of massage rather than the knowledge of the art. The article on Nursing, by Miss Amy Hughes, also admirably fulfils its purpose as explained by the editor, that of showing the physician what may be expected of a nurse, and may also serve a more practical purpose. We cannot share the opinion of those who believe that physicians understand nursing by instinct. Dr. Leech's article on the Principles of Drug Therapeutics deals rather with a large number of details than with principles, for obvious reasons, and shows a cheerful optimism as regards the effects of many old and not a few new drugs.

Other noteworthy articles in this part of the book are those of Sir Dyce Duckworth on Dietetics and of Dr. Eustace Smith on Diet and Therapeutics of Children.

Division two is devoted to fevers, and is subdivided into two parts, a chapter on Insolation by Sir Joseph Fayrer composing the first of these. Nothing new is added here to the pathology of sunstroke, and the treatment of thermic fever advised, viz., by the use of quinine, antipyrin, phenacetin, antifebrin, and aconite, is not likely to be used in the United States so long as ice can be obtained, whatever may be its advantages in India.

The second part begins with a chapter on the General Pathology of Infection, in which Dr. Kanthack treats this difficult subject with great skill. This is followed by chapters on Local and General Diseases due to Pyococci and to some of the Infectious Fevers. Most of these articles are valuable. From their number, detailed consideration is impossible here. The reader will doubtless be especially interested in knowing how certain important topics are handled. The article on Diphtheria is one of the longest and is the work of four men, Mr. R. Thorne Thorne, Dr. Samuel Gee, Dr. Kanthack, and Dr. W. P. Herringham. With regard to the uncertainty caused by the discovery of diphtheria-bacilli without membrane, Dr. Gee is willing to wait for further knowledge. Dr. Kanthack "must refuse to call any lesion diphtheria unless it is associated with the bacillus; conversely, any morbid process accompanied by this organism is diphtheria." As regards the treatment of pharyngeal diphtheria, 20 to 30 per cent. solution of carbolic acid in sulphoricinic acid is recommended as the most efficient and least painful application. It is admitted that these applications are exhausting to the patient, and

a spray of boric-acid solution is recommended instead. Alcohol and strychnine are recommended for weak heart. The details for the treatment other than by serum are good as far as they go, but hardly explicit enough for a young practitioner. In laryngeal diphtheria Dr. Gee opposes the use of emetics on rational grounds. Tracheotomy is advocated when dyspnœa becomes considerable. "Intubation is a topic which hardly needs to be discussed with reference to diphtheritic laryngitis. In this disease tubage is not a reasonable method of treatment, unless, in a given case, we know that the exudation is confined to the larynx and will not spread beyond it. But these are certainties to which we cannot attain, and in practice we have nothing more to guide us than probabilities, which may be high or may be low. If we can believe the croup is not membranous, or that, if membranous, the disease does not extend below the larynx, we may be disposed to try intubation, but always with the prospect of having to perform tracheotomy afterward. Difficulties and dangers attend tracheotomy, and tubage is not free from them. What are called statistics are of little value in determining the relative merits of the two operations, and are of no value at all, if among successful intubations are to be reckoned cases in which the tube passed out per anum." The last sentence is obscure, but we have quoted the whole paragraph to indicate the view of the author (Dr. Gee). To those who find intubation a valuable means of treatment in many cases this judgment will seem one-sided. The directions for the serum-treatment are clear.

The article on Enteric Fever is by Dr. Dreschfeld. It is full, clear, and well arranged, and, being by one writer only, is free from repetition and contradiction. In describing the history of enteric fever the author does not allude to the important part taken by Louis and the American physicians in establishing the specific nature of the disease. Of course, this did not make less valuable or less difficult the task of Sir William Jenner, in England. As regards the etiology of typhoid fever the author holds that the bacillus of Eberth is the sole cause. The possibility that some cases classed clinically and anatomically as typhoid may be due to other microbes is not mentioned. Various methods of treatment are described, and their advantages and disadvantages compared. Antipyretic drugs are not condemned as strongly as they should be, and the doses of the various antipyretics are all, in our opinion, too large for any purpose. Of the antiseptic treatment, so-called, the author says he is inclined by experience to think well, though he adds that it is inferior to the cold-water treatment. Altogther the article is a valuable one.

Cholera has been described by five specialists, with the result of producing a valuable article, though, as might be supposed, containing contradictions. Thus Mr. Ernest Hart and Dr. Solomon Charles Smith hold that cholera is due to Koch's cholera-bacillus, but Dr. Kanthack does not think we have yet reached a conclusion on the matter. His description of the development of our knowledge of the bacteriology of cholera is very good

The other articles in this part are: Septicæmia and Pyæmia, and Erysipelas, by Mr. Watson Cheyne; Infective Endocarditis, by Dr. Dreschfeld; Puerperal Septic Disease, by Dr. Playfair; Furuncle and Carbuncles, by Mr. Melsome; Epidemic Pneumonia, by Dr. Whitelegge; Epidemic Cerebrospinal Meningitis, by Dr. Ormerod; Influenza, by Dr. Goodhart; Tetanus, by Dr. George M. Humphrey and Dr. Sims

Woodhead ; Plague, by Dr. J. F. Payne ; Relapsing Fever, by Dr.
Rabagliata and Dr. Wesbrook. These are all good, and some are valu-
able additions to medical literature. The volume, as a whole, deserves
high praise, and the three volumes promised to complete the *System* will
be awaited with great interest. The paper and presswork are good ;
the few illustrations answer their purpose. There is an index of authori-
ties, as well as a general index. The proper names have suffered some-
what at the hands of the printer.   G. D.

MINOR SURGERY AND BANDAGING. By HENRY R. WHARTON, M.D.
    Third edition. Philadelphia and New York: Lea Brothers & Co., 1896.

THE appreciation which is felt for this work by students and the pro-
fession is evident from the publication of three editions in less than five
years. The present issue is larger than the previous ones and retains
the same general characteristics. The reader is particularly struck with
the excellent illustrations given in the section on Bandaging, which are
evidently taken from photographs of patients upon whom the bandages
have been applied. The sections on Excision of Joints and Operations
upon the Nerves and Tendons have been made more comprehensive than
in previous editions. Taken as a whole, the book is exceedingly satis-
factory and contains much information which will be found useful to
those teaching or studying operative surgery. It is not intended to be
a complete discussion of all the possible operations on the human body,
but is written from the standpoint of a practical teacher of operative
surgery who desires to furnish his classes with a text-book which will
meet the requirements of their collegiate course.

A good deal of attention is paid in Part II. to the preparation of
materials for aseptic and antiseptic surgery. A reviewer naturally
reads this portion of the work with special attention, because of its
great importance. It is satisfactory, though perhaps in some particulars
not so lucid as is desirable for those beginning the study of modern sur-
gery. The recommendation that catgut ligatures and sutures be washed
with castile soap and water before being placed in ether is of doubtful
value. It would probably make the catgut soft and almost useless. In
some places the directions scarcely seem to be explicit enough, as, for
example, on page 153 ; it would seem from the description there given
that in performing operations in an aseptic manner sterilized water
alone is used for preparing the operative area and the surgeon's hands.
While it is possible that this method may be employed by a few oper-
ators, it would not be trusted by many. The use of soap and antiseptic
solutions to prepare the skin of the patient and the hands of the sur-
geon is by most surgeons considered an important preparatory step,
even if sterilized water is to be subsequently used. It is possible that
the author does not intend to say what he seems to say in this para-
graph. A rather unfortunate typographical error is seen on page 121,
where the bacillus pyocyaneus is called the bacillus pyogenes.

In discussing the ambulant treatment of fractures of the lower ex-
tremity the author states that the patient is allowed to walk about,
bearing his weight upon the injured limb. The essential point in

applying this dressing is so to construct it that the patient does *not* bear his weight upon the injured limb, but upon the splint, which must be made strong enough and constructed in such a manner as to allow the injured limb to hang within it. The plaster-of-Paris splint is practically an artificial limb. This error in statement is to be regretted. It is possible that these defects may be due to haste in preparing the manuscript.

The author's fondness for long sentences also perhaps tends to obscurity. Sentences containing from thirteen to twenty-five lines are apt to become involved and to confuse the reader. Pages 122, 123, 347 show instances of this peculiarity of literary style.

<div style="text-align: right">J. B. R.</div>

PRACTICAL MIDWIFERY: A HANDBOOK OF TREATMENT. By EDWARD REYNOLDS, M.D., Fellow of the American Gynæcological Society, of the Obstetric Society of Boston, etc. ; Assistant in Obstetrics in Harvard University; Physician to Outpatients of the Boston Lying-in Hospital, etc. Third revised edition. Pp. 427. New York: Wm. Wood & Co., 1896.

WE gladly welcome the third edition of this most excellent book. Its first appearance five years ago brought within convenient compass the modern treatment of obstetrics in a better manner than had previously been done. In its second edition the author included symphysiotomy and revised the treatment of extra-uterine pregnancy in accordance with the abandoning of electrical treatment, which has become well nigh unanimous. In the third edition he has recast the chapters on Asepsis and the Treatment of Septicæmia, and described the use of gauze-packing for hemorrhage and the surgical methods of inducing abortion and premature labor.

While it is true that " good wine needs no bush," still good material should be put in worthy dress. It is much to be regretted that so good a book in each of its editions has been so badly printed and so wretchedly illustrated. The cheapest woodcuts have been employed in illustrating this volume, although the resources in the art of the modern book-maker could have given the author worthy reproductions of his excellent original illustrations. The book should have been reprinted with appropriate and worthy type and illustrations. The author has covered the field of modern obstetric practice in a most satisfactory way, and his book is among the best of the modern handbooks upon the subject.

<div style="text-align: right">E. P. D.</div>

TWENTIETH CENTURY PRACTICE: AN INTERNATIONAL ENCYCLOPÆDIA OF MODERN MEDICAL SCIENCE BY LEADING AUTHORITIES OF EUROPE AND AMERICA. Edited by THOMAS L. STEDMAN, M.D. Volume VI. New York: Wm. Wood & Co., 1896.

THE first article in this volume, by Professor James, of London, is on Diseases of the Nose. Evidently prepared for the general practitioner, it is to that extent accurate and reliable, and, like the following chapter on Diseases of the Accessory Sinuses of the Nose, by Jonathan Wright, of Brooklyn, may be consulted with profit.

E. J. Moure, of Bordeaux, has written the chapters on Diseases of the Nasopharynx and Pharynx and Diseases of the Tonsils. Why these should be separated by the article on Diseases of the Ear is hard to understand. Dr. Moure's articles are readable and give a clear exposition of his own views, but these are not, in our opinion, quite up to the usual standpoint in America. Tonsillitis is not described so well as we are accustomed to find it in the works of American authors. The description of He petic Tonsillitis, which the author regards " as one of the manifestations of herpetic fever," seems somewhat antiquated. Diphtheria is considered under the title of Diphtheritic Angina. This is merely an epitome, it being no doubt the intention of the editor to have diphtheria described more exhaustively in a later volume. The present short article is not so happily conceived as we should like. Diagnosis is dismissed in a few lines. The author says that " to dwell at length upon the points of diagnosis would be a pure waste of time, since the bacterioscopic examination alone can give a certain result. Furthermore, what we seek to know today is simply whether there is or is not present the bacillus of diphtheria, and whether the disease [*sic*] is a proper one for the employment of serumtherapy." This is not quite true. The important fact that there is a patient to treat behind the "disease" should be intimated here as well as in the section on Treatment, and some fuller advice should be given than is given here in regard to the treatment of doubtful cases until the bacterioscopic examination has been made, if it can be made at all.

In the section on Diseases of the Ear Dr. Albert H. Buck has made the most of his space, but the article is far too short to give the amount of theoretical knowledge of the subject that every physician should have. In a work so extensive as this it would seem as if more space could have been used for that purpose.

Diseases of the Larynx fare better at the hands of Francke H. Bosworth, as do those of the Trachea and Bronchial Tubes, by Sir T. Grainer Stewart and George Alexander Gibson. Both these sections are treated from a practical point of view, but with considerable detail, and the article on the Trachea and Bronchial Tubes is furnished with references to authors cited.

Winslow Anderson, of San Francisco, has been assigned the section on Diseases of the Lungs, excluding Croupous Pneumonia and Tuberculosis. In one respect this section reaches an unusual completeness, viz., in the chapter headed Diseases of the Bronchial Arteries. The description of the symptoms of inflammation of the pulmonary arteries is quite vivid and the remarks on treatment full, though contradictory. The use of diaphoretics to " open the pores of the skin " (p. 624) is well known to the laity. On the other hand, more important diseases, like infarct of the lung and chronic pneumonia, receive very inadequate consideration.

This volume, on the whole, does not reach the plane attained by the fourth of the series, which immediately preceded it. The lack of system which permits Diseases of the Ear to be classed among Diseases of the Respiratory Organs, and the lack of fulness in certain articles, are again prominent as they were in the first two volumes. This volume appeared out of order, but nevertheless at the time Volume V. was due. The editors and publishers are to be congratulated on the prompt appearance of the volumes; but if this is done at the expense of careful editorial supervision, the gain is a doubtful one.   G. D.

PROGRESS

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

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The Value and Method of Using Digitoxin in Cardiac Diseases.—DR. KARL HOFMANN notes two objections to the employment of this substance, the one its insolubility in water, and the other its causing vigorous local irritation. It has been used in three instances by the mouth, in thirty-seven by subcutaneous injection, and in nineteen by enemata. By the first method tablets of $\frac{1}{250}$ of a grain were given. By the second 1 part of the drug was dissolved in 1500 parts of distilled water and 500 parts of absolute alcohol. The usual dose ranged from $\frac{1}{125}$ to $\frac{1}{64}$ of a grain, the maximum single dose being about $\frac{1}{48}$ of a grain. The daily dosage should not exceed $\frac{1}{32}$ of a grain. The remedy should be used freely for from two to four days; the total amount in exceptional cases has been $\frac{1}{6}$ of a grain. The injections are followed by local burning pain lasting for from one-half to three or four hours, and redness for two or three days which is sensitive to pressure. Only once in about two hundred injections did an abscess supervene. By the last method a solution in 500 parts of absolute alcohol with 9500 parts of water was employed. The dose is as before, and the duration of treatment from three to five days; the maximum amount used was $\frac{1}{8}$ of a grain. Inappetence, nausea, vomiting, and pain in the epigastrium occurred in nearly the same proportion (one-fourth), whether subcutaneous injections or enemata were administered. It is, however, noticeable that these symptoms were pronounced in the earlier part of the investigation, when larger doses were continued over longer periods of time. Six hours after the first dose in many instances the pulse became stronger and the dyspnœa was lessened. Within twelve hours in nearly all cases diuresis was marked. If enemata were employed, these changes occurred in from twenty-four to thirty-six hours. In spite of the objections to subcutaneous injections the speedier results are favorable to its use, or, as was done in severe cases, one or two injections may be given and the treatment then carried on by enemata. The indications for the use of the drug are those pathological conditions in

which there are arterial ischæmia and venous hyperæmia—an abnormal division of blood between the systemic and pulmonary circulation. Upon forty-four patients the results were unmistakable. Of these, twenty-three showed moderately good results: diminution of the dyspnœa, strengthening of the pulse, and lessened frequency, moderate diuresis, and improvement in the general condition. In twenty-one instances, principally of mitral incompetency, the broadening of the pulse with increase of tension, which speedily appeared within from six to twelve hours, and reached its highest point upon the fourth or fifth day, was well marked. The diminution in pulse-rate, which in a few instances reached to forty, appeared after two or three days, and remained low, in spite of the discontinuance of the drug, from seven to ten days, thus indicating its slow elimination. A peculiar effect upon the pulse was noticed—that a previously existing dicrotism became less or disappeared altogether. So far as concerns arhythmia and irregularity of the pulse it was repeatedly noted that with the improvement of the other pulse-qualities these also were bettered. There was also a constant improvement in dyspnœa and sensations of oppression. The diuretic effect, as stated by other authors, is confirmed in this paper. In about one-third of the cases diuresis was prompt and copious. The most important contraindication to the use of the drug (besides severe muscular degeneration) is existing well-marked gastro-intestinal disturbance. In children, however, this remedy must be used only with the greatest care.— *Wiener klinische Wochenschrift,* 1896, No. 42, S. 939.

The Therapeutic Uses of Tannoform.—DRS. D. DE BUCK and L. DE MOON note the inconveniences of tannin, notably its property of dissolving in the stomach, where it irritates the mucous membrane and precipitates albumin, mucin, and gelatin, which prevent its use as an intestinal astringent. Tannoform is prepared by dissolving tannin in warm water to which a solution of formic aldehyd is added. Some time after the addition of concentrated hydrochloric acid a precipitate forms, which is washed with water and dried. The result is a light-yellowish powder without taste or odor, insoluble in water and in solvents of organic substances, alcohol excepted, but soluble in weak alkaline solutions, from which acids precipitate it. From this combination we get both an astringent and an antiseptic which is useful for the treatment of intestinal catarrh, both acute and chronic. Even in a 15-grain dose it does not irritate. It is useful also as a topical application for wounds and ulcers, in bromidrosis, bedsores, inflammations of mucous surfaces other than those of the digestive tract, as balanitis, vaginitis, ozæna. Twenty-one instances of its use are reported.—*Revue de Thérapeutique Médico-chirurgicale,* 1896, No. 19, p. 579.

Tannigen.—DR. R. HIRSCHBERG states that this drug passes through the stomach without decomposition, but in the intestine is broken up into tannic and acetic acids; this decomposition takes place slowly, so that the entire length of the alimentary canal may be acted upon. The dose for an adult is 7½ grains, given in a cachet. If administered in water or milk, it forms glutinous masses which are difficult to swallow. It seems to have its most important use in the diarrhœas of various kinds, and is contraindicated in

inflammatory conditions of the intestine with marked transudation of serum, in simple dyspepsias and intestinal disturbances caused by them. —*Revue de Thérapeutique Médico-chirurgicale*, 1896, No. 20, p. 618.

The Antiseptic Power of some Prepared Antiseptic Solutions.—Dr. G. C. CRANDALL, in order to ascertain the power of some of these solutions to check the growth of bacteria, made a series of experiments, using sterilized bouillon as a culture-medium, with anthrax, diphtheria, and streptococci. The solutions tested were borolyptol, pasteurin, euthymol, and listerin, in amount from $\frac{1}{2}$ to 50 per cent. The results show a marked difference in the power of the preparations; the first two are active in relatively weak solutions, the last two must be used in very strong solutions. Their general composition, so far as can be ascertained from their formulas, is similar; but the first two contain formaldehyd, which doubtless enhances their antiseptic power. The second preparation contains also the oil of cinnamon, which is a very efficient antiseptic. These two substances appear to be well adapted for use as prepared antiseptics, as the solutions containing them certainly far surpass in antiseptic power the two which do not contain them. The volatile and diffusible properties of formaldehyd render it more effective as a rapid antiseptic than the other elements which we find in these preparations. —*St. Louis Medical and Surgical Journal*, 1896, No. 671, p. 293.

The Value of Amyloform in Surgery.—Dr. C. LONGARD states that this is a result of the chemical union of formaldehyd with starch, and appears as a white powder, without odor or poisonous properties, and when rubbed in the hand has a sandy feel. It is absolutely insoluble in solvents, and is of such stability that it is not decomposed by high temperatures. Gauze, when impregnated by it, can be treated with steam without changing the drug in chemical constitution or physical character. It may be stated that: 1. It is strongly antiseptic, deodorant, and absorbent. 2. It is not decomposed by high temperatures. 3. It is non-poisonous and non-irritant. 4. It is cheap. Various suggestions as to its use follow, and the general conclusion is that in no way is it inferior to iodoform.— *Therapeutische Monatshefte*, 1896, Heft 10, S. 557.

The Uses of Formaldehyd.—Mr. F. C. J. BIRD states that the commercial article known by this name is a concentrated solution containing 40 per cent. of the drug. The effects produced by the various solutions are as follows: 1 to 125,000 kills anthrax-bacilli; 1 to 50,000 prevents the development of typhus-bacillus; 1 to 25,000 forms a useful injection in leucorrhœa; 1 to 2500 destroys the more resistant micro-organisms in one hour; 1 to 500 is useful for the irrigation of catheters and as a mouth-wash; 1 to 200 or 250 is a general disinfectant solution for washing hands and instruments, spraying in sick-rooms, and as a deodorant; 1 to 100 is used for lupus, psoriasis, and other diseases of the skin.—*American Journal of Pharmacy*, 1896, No. 11, p. 617.

Hæmol.—Dr. JOHANNES BARTELT reports thirty instances of the use of this drug. He concludes: 1. That there is no doubt that this remedy is

capable of absorption, and in very debilitated individuals is useful for the building up anew of the red blood-corpuscles. 2. The relatively small content of iron frequently, even after three weeks' use, does not present any clinical results; therefore the favorable action of hæmol must be due to entire constitution of the remedy, which may be designated as a blood-corpuscle extract. 3. Its administration is very simple, for, with the exception of gastric ulcer, which it may irritate, there are no untoward symptoms arising from its use. It does not give rise to constipation, the appetite remains unchanged or improved, and the teeth do not become blackened nor carious. 4. There is especially to be commended for the use of neurologists and dermatologists a combination with as much arsenous acid as may be necessary, a hundred times as much of the drug, which should then be given in pill-form. In this way the unpleasant gastric symptoms, to which arsenic may give rise, are obviated. Doubtless the arsenous acid combines with the drug, forming an arseno-hæmol, analogous to the copper-, zinc-, or mercury-hæmol, and it is probable that there is a rapid absorption.—*Therapeutische Monatshefte*, 1896, Heft 10, S. 533.

The Effect of Alcohol upon the Growth of Children.—M. LANCEREAUX details the important facts in a striking example, and goes on to say that in the alimentary hygiene of children milk should not be neglected, because it contains all that is necessary for their development—fatty substances, albumin, oxygen, and the principal minerals. With it we can be certain that the growth will be normal; that there will be no failure in height, no rhachitis, no bony lesion. The use of alcohol by children is one cause of depopulation. The conclusion reached is that it is as dangerous as is an excess of alcohloic beverages for an adult; for the adolescent they are deadly, because they cause organic changes, hinder physical development, and impair the normal faculties even to the extent of degeneracy. For these reasons, then, alcohol should be proscribed as drink for children.—*Journal des Praticiens*, 1896 (2e serie), No. 42, p. 665.

Serotherapy in Pulmonary Tuberculosis.—DR. L. R. REGNIER reports his experience with the serum of Maragliano (see this JOURNAL, vol. cxii., No. 4, p. 469), which contains the specific antitoxins which neutralize the tuberculous poisons in man and animals, and whose bactericidal power can be easily demonstrated *in vitro*. Together with three preceding observations, he now presents nine. These are few in number, but possess some value because of the length of time during which they were under observation. After citing a recent report by Maragliano, of the results in three hundred and twenty-four [274] cases, of which fifty are stated to be stationary, one hundred and forty improved, forty-five showed good results, twenty-five none, and fourteen died. Those instances of tuberculosis associated with other microbes, and those of rapid progress show the least favorable results. It is evident that in the apyretic cases, even when cavities exist, the serum is endowed with a real therapeutic power, and that in proper doses it is not dangerous. So far as regards its efficacy we cannot go far wrong when we state that it is one of the most active agents which we have at our disposal for the contest against pulmonary tuberculosis.—*La Progrès Médical*, 1896, No. 41, p. 233.

MEDICINE.

UNDER THE CHARGE OF

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AND

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The Left Auricle in Mitral Stenosis.—In a thesis of seventy-five pages SAMWAYS (*Paris*, 1896) attempts to prove that in pure mitral stenosis compensation is maintained (in the majority of cases) by hypertrophy of the auricle, associated with a prolongation of the auricular systole, which continues during a part or all of the time during which the ventricle is expelling its contents. To show that hypertrophy of the auricle predominates over dilatation, he offers in evidence quotations from Corvisart, Laennec, Stokes, Potain, and Rendu; also a study of the statistics of Guy's Hospital, and several surgical autopsies that revealed mitral stenosis accompanied by hypertrophy of the auricle without dilatation.

Good evidence of the fact that the auricle is able to bear the brunt of the valvular lesions Samways finds in the clinical fact that in cases of mitral stenosis with the "buttonhole" orifice, so long as the strength of the hypertrophied auricle is maintained there is only the presystolic and not the systolic murmur audible.

This phenomenon is explained on the basis of the physical law, "the pressure necessary to dilate a hollow sphere varies inversely with its radius," so that the weaker sphere when small may be able to maintain an equilibrium (under common pressure) against a sphere with more resistant walls, provided the latter be larger. Samways maintains that the same physical conditions exist in mitral stenosis accompanied by hypertrophy of the left auricle; *e. g.*, the auricle contracts at a time when the ventricle is dilated, and by prolonging the auricular systole it encroaches upon the systolic phase of the ventricle long enough to prevent regurgitation into the auricle.

This prolongation of the auricular systole in mitral stenosis Samways does not claim to prove, but considers it highly probable, in view of the work of Roy and Adami and Potain, who state that the auricular systole lasts during the preparatory or mitral phase of the ventricular systole in a normal heart. The added clinical fact that in well-compensated mitral stenosis the murmur precedes the valvular tone heard at the apex during the systole, and also that the first phase of the apex-excursion is accompanied by the presystolic murmur, makes it seem probable that the auricle maintains its contraction during a large portion of the time occupied by the systole of the ventricle. Furthermore, when dilatation of the auricle supervenes compensation is broken and a systolic as well as a presystolic murmur is heard. The systolic murmur heard at the heart's apex in mitral stenosis may, in some cases, be from the

tricuspid orifice, as the hypertrophied and dilated right heart may form the apex of the heart.

The Etiology of Erythromelalgia.—DEHIO (*Berliner klinische Wochenschrift*, 1896, No. 37) reports an interesting case of erythromelalgia, and endeavors to explain the various symptoms of the affection.

The patient, a washerwoman, aged thirty years, had suffered from repeated attacks for a period of five years. The palmar surface of the left hand, including that of the fingers, was of a deep-red color and extremely painful on pressure or motion. The skin over the same area presented minute nodules the size of millet-seeds, and was constantly bathed with perspiration. On the dorsum of the second and third phalanges the skin was thin, smooth, and very glossy. The muscles of the left hand were a trifle atrophied, and the muscular power somewhat diminished, both of which were attributed to disuse of the hand for so long a time. The sole of the left foot and ball of the great toe presented a condition similar to that found in the left hand. Severe pain was experienced in the left shoulder-joint whenever the arm was moved, although there was no evidence of a local joint-affection. The patient's face was of a cyanotic, leaden hue, and the subcutaneous tissue thickened and dense, somewhat suggesting myxœdema. Dizziness and intense headaches, associated with vomiting, were frequently experienced. An interesting feature in the case was the presence of distinct arteriosclerotic changes in the left radial and ulnar arteries, there being no evidence of similar changes in other parts of the vascular system.

The sensibility of the affected parts was slightly impaired, but an electrical examination of the muscles and nerves failed to give any evidence of the reaction of degeneration.

Therapeutic agents giving no permanent relief, portions of the left ulnar nerve and artery 4 cm. long were excised just above the wrist-joint. After the operation the skin of the little finger resumed its natural color and was quite dry, while the remainder of the hand retained its cyanotic, hyperæmic appearance and moist condition. Histological examination of the ulnar nerve showed it to be perfectly normal, whereas definite arteriosclerotic changes were present in the ulnar artery, the intima being much thickened and the lumen of the vessel markedly diminished.

The return of the normal color of the little finger after operation led Dehio to conclude that the hyperæmia of the affected part was due to some lesion that caused stimulation of the vasodilator nerve-fibres that pass along with the nerve-trunks. Had the erythema been due to a paralysis of the vasoconstrictor nerve-fibres no change in color could be expected to follow excision of a portion of the nerve.

The excessive sweating and the pain were attributed to irritation of the nerves controlling the sweat-secretion and irritation of the sensory nerves respectively. The formation of minute nodules and the atrophic changes in the skin are not clearly explained, but are considered to be due to trophic disturbances.

An ingenious explanation is given for the changes in the left radial and ulnar arteries. Thoma found that where the calibre of a vessel was too large for the volume of blood that passed through it, that a compensatory diminu-

tion in the size of the lumen of the vessel occurred, and that this was produced by a thickening of the intima. Dehio explains the thickening of the intima of the ulnar artery in this case in a similar manner.

Dehio, contrary to the views of many, considers that erythromelalgia is a special disease, with a special pathology of its own. He thinks that the hand-and-foot symptoms in his case were due to lesions in the cervical and lumbar portions of the spinal cord respectively, and regards the most likely seat to be in the posterior cornu of the gray matter. The intense headache, dizziness, vomiting, and facial symptoms, he thinks, were due to an intracranial lesion. He is of the opinion that erythromelalgia is central rather than peripheral in origin, and that the lesion may probably be gliomatous in nature.

Carious Teeth and Tuberculous Cervical Glands.—STARCK (*Revue de la Tuberculose*, July, 1896) notes the frequent association between carious teeth and enlargement of the cervical lymph-glands. He examined 113 children with enlargement of the cervical lymph-glands, and found that 1 per cent. had carious teeth. Not being able to find any other apparent cause for the condition, he concluded that the swollen glands resulted from the defective teeth in this series of cases. They corresponded in situation, in time of development, and in the degree of enlargement with the condition of the teeth. The involved glands were situated on the same side as the diseased teeth, the anterior glands being enlarged if the incisors were carious, and those at the angle of the jaw when the molars were involved. Toothache frequently preceded the enlargement of the glands. Starck is of the opinion that the enlarged glands are tuberculous in quite a number of these cases. He reports two cases in which he was able to demonstrate pretty conclusively that the carious teeth had been the point of entrance of the tubercle-bacilli. One, a boy, aged eighteen years, who had always been healthy and without a family history of tuberculosis, had caries of the molar teeth on both sides, with enlargement of the cervical glands. The glands were excised and the teeth extracted. The former proved to be tuberculous on examination, and tubercle-bacilli were found in cover-slip preparations from two of the decayed teeth. The second was a girl, aged fourteen years, with excellent personal history and without a history of tuberculosis in the family. The first inferior molar tooth on the left side was carious, and there was an enlarged gland below the ramus of the jaw. The gland was removed and showed definite tuberculous disease. Between the diseased molar and the adjacent tooth and also forming the floor of the cavity in the tooth were characteristic tuberculous nodules with typical giant-cells. This latter case is specially interesting, as it seems to show that a carious tooth may be the seat of a primary tuberculous focus. With regard to treatment, the glands should be at once removed and the carious teeth should be either properly filled or extracted. As a prophylactic, the teeth should be better cared for, and Starck advocates with Rose the placing of school-children under the supervision of a competent dentist.

Diabetic Neuritis, with Interesting Changes in the Muscles.—FRASER (*Edinburgh Medical Journal*, October, 1896) reports a fatal case of diabetic

neuritis. There was nothing special to note in the clinical history of the
case. The ordinary symptoms of neuritis were present in both lower ex-
tremities. At autopsy portions of both optic and posterior tibial nerves,
as well as portions of the tibialis posticus muscle, were removed for exami-
nation. The optic nerve, on microscopic examination, showed well-marked
parenchymatous degeneration in various stages. In the posterior tibial nerves
the degenerative change was almost entirely limited to the medullary sheath
of the nerve-fibres, the axis-cylinder remaining intact throughout, although
it here and there presented slight varicosities. The change in the nerve-
fibres resembled a degenerative change first described by Gombault in the
nerves of guinea-pigs, to which small quantities of white-lead had been ad-
ministered along with their food. Gombault gave the degenerative change
the name of " neurite segmentaire periaxile."

The microscopic examination of the tibialis posticus muscle showed an in-
teresting change. Sections stained with eosin and haematoxylin showed a
slight increase in the distinctness of the longitudinal striation of the muscle-
fibres. This increase was explained by treating the sections with osmic acid,
when it was found to be due to rows of minute fat-granules situated between
the fibrillæ of the muscle. The granules were all extremely small and ap-
peared to be developed from the cement-substance between the fibrils rather
than from the fibrils themselves. The degeneration did not affect the whole
of any one muscle-fibre, but only short lengths of the fibres, and gave the
section an appearance somewhat similar to that seen in fatty degeneration of
the heart. In the portions of the muscle where this degenerative change
was found the transverse striation of the fibres had disappeared. There was
no multiplication of the nuclei of the sarcolemma or of the connective tissue.
The process is different from that which results from a descending degenera-
tion of a nerve, and the change appears to be due to an independent and
direct action on the muscle itself of some toxic substance, rather than to any
want of trophic influence on the part of the nerve.

Fraser has been unable to find any similar condition described in the litera-
ture, and has suggested the name " disseminated interfibrillary fatty degen-
eration of the muscle " to the change.

Lymphangiectasis of the Tongue.—An interesting case of lymphangiec-
tasis of the tongue is reported by WILKINSON (*Quarterly Medical Journal*,
October, 1896). The patient was a little girl, nine years of age. There was
nothing of importance in the family history. The child had always been
pretty healthy, with the exception of slight attacks of inflammation of the
tongue. The mother thought that the child's tongue had always been rather
large, although her attention was specially drawn to the fact when the patient
was four years of age. After each attack of inflammation the tongue was
somewhat larger than before. An examination of the organ between the
inflammatory attacks showed it definitely, although not greatly, enlarged,
and marked at the right side by impressions of the teeth and alveolar pro-
cesses. There was a deep central groove on the dorsum, with a minor groove
on either side running parallel. The whole of the surface of the tongue,
particularly on the under surface just below the tip and lateral margins, was
covered with small, transparent vesicles, looking like sudamina on the skin,

In the left half of the tongue, about midway between the tip and base, was an induration about the size of an almond. The vesicles in front of the lump were more numerous on the left than on the right side. The majority of the vesicles contained a clear lymph and collapsed after being opened. A few contained some blood.

Wilkinson regards the condition as being due to a dilatation of the lymphatics, and that it was probably a case of macroglossia in an early stage. The acute inflammatory attacks were likely due to the tongue getting between the teeth and being bitten. The inflammatory exudation would cause a further obstruction of the lymphatics and thus explain the increase in size after each acute attack.

In 1854 Virchow was the first to show that the so-called hypertrophy of the tongue, or macroglossia, consisted of a dilatation of the lymphatics. This lymphatic dilatation is considered in most cases to be due to a congenital lack of development of the lymphatics.

SURGERY.

UNDER THE CHARGE OF

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ASSISTED BY

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On the Operative Treatment of Hypertrophy of the Prostate, particularly by Ligation of the Vasa Deferentia.—Including two observations of his own, G. STEINHEIL (*Thèse de Paris*, 1896) has collected fifty-seven cases of prostatic hypertrophy, in which ligation of the vasa deferentia was performed. The author believes that the clinical results of ligation and of resection of the vasa deferentia in prostatic hypertrophy are similar to those of castration.

Resection, he says, is to be preferred to simple ligation, or the subcutaneous division. The operation has given good results, especially in the cases of congested, soft, elastic swellings of the prostate.

He thinks the operation is contraindicated in the irregular, hard, fibrous forms of prostatic enlargement, and when the ability of the bladder to contract is lost completely. In these cases suprapubic cystotomy, perineal prostatotomy, as recommended by Harrison, and suprapubic prostatectomy have the preference.

In very feeble, old people, and in those with severe organic or mental disturbances, any operative measure is usually contraindicated.

While the author admits that castration and the permanent catheter are the

basis of the modern treatment of prostatic hypertrophy, he prefers resection of the vasa deferentia to the former, and thinks, if this fails, resort to castration would be futile. This is, however, not borne out by the experience of other writers.

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Rupture of the Pancreas.—HADRA reports the following case in the *Medical Record*, 1896, vol. i., No. 3: a boy, aged nine years, was struck in the epigastrium with the handle of a bicycle. He fainted, vomited, and in a short time appeared to have fully rallied. Five hours after the accident he began to have severe abdominal pain. Expectant treatment was adopted, as no lesion could be detected, and slow improvement followed. The patient's appetite was excessive and perverted. Twenty-four days after the injury a swelling in the region of the stomach was first noted. Three days later a fluctuating tumor could be detected behind the stomach. The latter was plainly visible through the abdominal wall, as was also the transverse colon. The temperature varied between 98.9° and 99.2°.

A diagnosis of rupture of the pancreas was made and the patient operated upon. On opening the space between the stomach and the transverse colon a clear, limpid fluid escaped. The fluid was found to be alkaline, and readily changed starch into sugar. Drainage was provided for, and the wound closed. Recovery followed.

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A New Method of Defining the Fissure of Rolando.—MORISON describes (*British Medical Journal*, 1896, No. 1868) the following method for locating the fissure of Rolando :

" The measurements may be made with a piece of sterilized silk marked off by knots to form the triangle, or by defining the sides of the triangle by means of the surgeon's finger, whose length is already known. A point is taken half-way between the glabella and the external occipital protuberance, and the breadth of the little finger behind it (about half an inch) indicates the apex of the triangle. An isosceles triangle is then mapped out on the scalp ; its sides are three and three-quarters inches long. One lies in the middle line forward from the point mentioned above. The base measures four and one-eighth inches, and is anterior. The posterior side of the triangle is over the fissure of Rolando. Trigonometrically the apical angle of this triangle is 67° 27′ 52″, and this is practically identical with the angle formed by the fissure and the middle line of the skull worked out by other methods, and, from an examination of a large number of skulls of various sizes, is constant and correct."

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The Treatment of Paralytic Clubfoot by an Osteoplasty in Combination with Arthotomy.—ISNARDI (*Cent. für Chirurgie*, March, 1896) reports two interesting cases in which he produced excellent results by the implantation of a fragment of denuded bone between the astragalus and tibia, thus producing a bony ankylosis.

He was led to this procedure by finding, on repeating an operation that had been unsuccessful, that there was a wedge-shaped space between the astragalus and tibia which had been filled only by connective tissue, and

consequently did not resist the counter-pressure after the joint was released from the bandage.

Reasoning that the result was similar to that of ununited fractures, where the bones are not in close apposition, he determined to induce bony anky-losis by filling in the space with freshly denuded bone. This was done, using a fragment of child's bone which had just been resected. The fragment was held in place by an iron-wire suture which ulcerated out later, with a small sequestrum. The author made the observation at that time that the new bone was penetrated by many arterial capillaries, showing that it acted as the skeleton over which the new bone grew, and was not of itself permanent.

Murphy's Anastomosis-buttons.—GRAFF (*Arch. für klin. Chir.*, 1896, Band 52, Heft 2), after a careful discussion of the application and method of employing these instruments in the production of anastomosis, comes to the following conclusions :

1. The Murphy button entirely replaces the intestinal suture. Its great value is the ease and rapidity with which it may be employed.

2. With proper technique, and employment of a well-constructed button, its use is absolutely harmless.

3. Outside conditions may complicate the course of recovery, but are less seldom seen, apparently, than one would suppose theoretically.

4. In every case it is recommended, for certainty, to employ a serous suture over the button.

The author recommends the use of the buttons in every case in which the result of the operation is dependent upon the rapid establishment of an an-astomosis, and hopes that the cases reported will lead other surgeons to employ them.

Ischæmic Contracture of the Flexor Muscles of the Forearm Corrected by Excision of a Portion of both Bones.—HENLE (*Cent. für. Chir.*, May 9, 1896) reports a case in which it was impossible to correct the deformity produced by the contraction of the flexor muscles of the forearm either by an operation embracing all the tendons or by forced extension under anæs-thesia, as in the former case the operation would have involved too great an area, and in the latter there would be no hope of permanent relief.

The ischæmic etiology of the deformity made the muscles useless, and their contractibility was destroyed by the formation of connective tissue within the muscles themselves.

There were only two methods of correcting the deformity : one was to lengthen the muscles, the other to shorten the bones ; the former was im-possible, so the author determined upon the latter.

The resection of both bones restored the usefulness of the arm and cor-rected the deformity.

Cholecysto-duodenostomy and Cholecysto-gastrostomy.—TERNIER (*Rev. de Chir.*, March, 1896) reports two cases that are of great clinical and physio-logical interest, illustrating how difficult diagnosis is in these cases, and proving that the loss of life by an external fistula does not materially affect nutrition, at least for a considerable length of time, and, in addition, that the

introduction of bile into the stomach either by a duodenal or gastric fistula does not hinder the action of the gastric juice, as has been already demonstrated in animals.

In the first case there were present chronic icterus and biliary lithiasis. Cholecystotomy was performed; a biliary fistula resulted, as the duct was found to be occluded ; the patient, however, continued to gain flesh, and was healthy despite the loss of bile. The inconvenience and irritation of the bile externally induced a second operation ; cholecysto-duodenostomy was performed, and the patient recovered and continued to improve until an intercurrent cancer of the duodenum obliterated the ampulla of Vater, and the symptoms returned again.

In the second case the patient presented marked icteric symptoms which became so aggravated and the gall-bladder so dilated that operation was decided upon. No calculi were present, but a neoplasm of the head of the pancreas with an involvement of the liver. A cholecystenterostomy was decided upon, but it was found impossible to bring the duodenum and gall-bladder together, so the author determined to perform a cholecysto-gastrostomy ; this was done, and the patient made a good recovery. The presence of the bile apparently had no influence upon the digestion of the stomach, as the patient gained in weight, and there were no symptoms of indigestion that could be called gastric.

Tendon-transplanting in the Treatment of Paralytic Deformities.—
GOLDTHWAIT (*Boston Med. and Surg. Journ.*, January 6, 1896) calls attention to this method as a possibility of furnishing better mechanical attachment for certain paralyzed or partially paralyzed muscles, as a part of the treatment of paralytic deformities.

The cases selected for operation are those in which one group of muscles has been destroyed, leaving the antagonizing or accessory muscles little if any impaired. This condition, if not treated, results in a definite deformity, simply from muscular activity ; and this becomes more marked as the age of the patient increases, partly because of the greater weight to be borne and partly because of the greater strength of the non-paralyzed muscles.

The author then details a number of cases with the *rationale* of the operation in each case. He deduces the following conclusions from his work on this subject :

The best results are to be looked for in the cases in which one group of muscles is paralyzed, leaving the antagonizing or accessory group unimpaired. Much of the deformity is due to the action of these muscles, without the control of the other group.

Four cases are reported after at least three months since the operation. The first case, that of an adult, was operated on over a year ago. In all there has been a marked improvement. In three cases the peroneus longus was attached to the tendo-Achillis, and the peroneus brevis to the flexor longus pollicis. In two cases the anterior tibial tendon was attached to the peroneus tertius.

The tendons were attached by splitting one and drawing the other through this, and suturing them with quilted sutures.

DERMATOLOGY.

UNDER THE CHARGE OF

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An Oidium in the Skin of a Case of Pseudo-lupus Vulgaris.—J. C. GILCHRIST and W. R. STOKES (*Bulletin of the Johns Hopkins Hospital*, July, 1896) report the results of microscopic investigation in a case of disease of the skin which resembled lupus vulgaris more than other diseases. Miliary abscesses were found in the epidermis and in the upper portion of the corium, in all of which were numbers of doubly contoured, refractive, round and ovoid bodies, many of them with buds, others with vacuoles. They were arranged singly or in groups, contained granular protoplasm, and resembled closely blastomycetes. No tubercle-bacilli could be found in any of the sections. The writers were of opinion that this extensive cutaneous disease was caused by the species of oïdium described, and that this is the only example in literature of a pure disease of the skin which has been shown to be caused by a species of oïdium, and the third example in which lesions of the human skin have been produced by organisms allied to the yeast-fungi, Busse's case and Gilchrist's case being the other two.

[The case is of great interest, especially in connection with Wernicke's Busse's, and Gilchrist's investigations in other similar cases, recently reported.]

A New Lotion for Certain Itching-diseases.—C. BŒCK (*Monatshefte für prak. Derm.*, Bd. 21, No. 3) gives the following formula, of value in dry, itching, inflammatory diseases of the skin : talc and powdered starch, of each 50 grammes ; glycerin, 20 ; lead-water, 100. This is to be diluted with twice the volume of water, shaken, and applied to the skin with a brush or mop and permitted to dry on. The effect of the lotion, which of course contains the talc in suspension, is cooling, anti-pruriginous, astringent, and antiseptic. Half of the lead-water may be replaced by a 1 per cent. boric-acid solution, especially where the skin is tender. The lotion is useful in acute and chronic dry eczema, papular eczema, and in inflammatory psoriasis, but is contraindicated in diseases in which there is fluid discharge.

[We have tried this lotion in papular and in erythematous eczema, and have found it useful.]

Local Use of Potassium Permanganate in Diseases of the Skin.—L. D. BULKLEY (*Medical Record*, February 29, 1896) finds this drug, in 1 to 2 per cent. strength, useful in a considerable number of cases of eczema, and also

in some other diseases accompanied with itching. The solution is brushed
or mopped over the surface and permitted to dry in, which it does quickly.
The brilliant pink or magenta-colored fluid turns very soon to a moderately
dark-brown, staining the skin for some little time and is finally cast off
by exfoliation of the tissues which it has oxidized. It is of most value
in subacute erythematous, papulo-squamous, and moist or weeping eczema.
Immediate relief from itching is usually experienced. It may be applied
two or three times daily. It often serves to reduce thickened skin, and in
some cases its use may be followed by zinc oxide lotion or an indifferent
ointment.

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Streaked Skin Affections of the Lower Extremity.—Julius Heller
(*International Atlas of Rare Skin Diseases*, Part xii., 1895) depicts collec-
tively several old and recent cases of this particular group of diseases of
the skin. The striated distribution of the disease over a part or the whole
of the lower extremity is dependent upon anatomical conditions, and is
common to the whole class of such affections. The cases depicted and
described were observed by the writer, by Unna, Shearer, Philippson-
Unna, and Neumann. Some were of an inflammatory nature, others pos-
sessed the general characters of nævi, for the most part unilateral. He con-
cludes that although the illustrations of the five cases, the history of the
diseases, and his observations upon the cases do not solve the pathogenesis
of these striated diseases of the skin, nevertheless they lead to the following
positive and not unimportant conclusions. All attempts to explain by any
one system the streaked or striated affections of the lower extremity have
failed. Just as in the one case involvement of the larger lymphatics can
without doubt be considered the cause of the streaked character of the erup-
tion, so in other cases this factor can be with certainty excluded. The
anatomical basis of every case ought therefore to be separately determined.

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Pitting about the Hair-cups.—In a paper read at the meeting of the
American Neurological Association, June, 1896 (*Journal of Nervous and Men-
tal Disease*, September, 1896) Browning calls attention to a trophic change
of the skin in certain nervous disorders of central origin. This change con-
sists in a faint depression, frequently oval, in the direction of the lines of the
skin, about the exit of each hair. The depression is slightly paler than
the surrounding skin, almost like a minute cicatrix, but soft to the touch.
The change is usually found upon the extremities, being most marked upon
the lower ones. On the upper extremities it is seen best on the outer side
of the forearms. On the lower extremities they are chiefly noticeable on
the front and outer side of the leg a little below the knee. In chronic
anterior myelitis associated with progressive muscular atrophy the author
has never found this pitting absent. Other diseases in which it has been
noted are paralysis due to lead-poisoning, spastic tabes of syphilitic origin,
grave hysteria. Apparently this pitting is to be regarded as indicative of
disease of the spinal cord, especially of the anterior horns, and is useful in
differentiating central from peripheral disease. Prognostically the pitting
indicates a grave disorder.

OBSTETRICS.

UNDER THE CHARGE OF

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The Early Recognition and Treatment of Puerperal Fever.—In the *British Medical Journal*, October 24, 1896, BYERS contributes an article upon this subject. He very wisely calls attention to the fact that every pregnant woman should be examined to determine the presence or absence of disease of the blood or deficiency in the processes of elimination. He believes that where antiseptic precautions are taken the pulse and temperature vary but little from the normal. The first symptoms of septic infection he considers rapid pulse and fever. The interesting question arises as to whether any cause but infection can produce marked change in pulse and temperature after confinement. He has occasionally seen such cases. Among others he describes tonsillitis, appendicitis, influenza, phthisis, rheumatism, old pelvic abscesses, and suppurating ovarian tumor as causing rapid pulse and high temperature after labor, while puerperal septic infection was absent. The earlier after labor the symptoms appear, the worse the prognosis. He distinguishes sapræmia and septicæmia.

In treatment he would thoroughly examine a patient so soon as symptoms appear. The uterus should be explored and any laceration in the genital tract disinfected. He has seen good results from prolonged intra-uterine irrigation. This should be continued twelve hours in some cases, a dilute antiseptic being employed. If the finger can detect sloughing membrane in the uterus, then curetting is indicated. Packing with gauze may well follow. As regards serum-treatment, sufficient experience is not at hand on which to base a judgment. Byers has had no experience with hysterectomy for this condition. He recognizes fully the value of tonics and food with these patients.

Variations in Weight in the Newborn Child, and their Cause.—In the *Archiv für Gynäkologie*, 1896, Band 52, Heft 2, SCHAEFFER reports his investigations upon this subject in the clinic at Heidelberg. His material was 592 healthy infants in the Heidelberg and Munich clinics, and they were observed on the seventh to fourteenth day after birth, 94 of them being studied daily. It was found that but $14\frac{1}{2}$ per cent. of these children had made good by the seventh day their initial loss in weight, while 41 per cent. had made good the loss or exceeded it by the fourteenth day. $44\frac{1}{2}$ per cent. weighed less two weeks after delivery than when born. The lowest weight was seen upon the third day, and the greatest gain from the tenth to the twelfth. The greatest variation was seen in boys rather than in girls.

Young and slender primiparæ gave birth to the lightest children, showing the least tendency to increase in weight. The same was true of mothers who had worked hard during pregnancy, or had been ill. Well-nourished women between the twentieth and twenty-ninth years of age gave birth to the heaviest children. The character of the mother's recovery from childbirth had little to do with the weight of the child. The development of the father and peculiarities of race affected the weight of the child considerably. A reason for the loss of weight in the first few days was found in the consumption of tissue to maintain the body-warmth. In the first three days, when but little fully formed milk is obtained, the excretion of uric acid is greatest. So soon, however, as milk-diet becomes established the quantity of urea increases in the child's urine. Premature children showed greater variations in weight and temperature and in the excretions. The children of tuberculous and syphilitic mothers failed to gain in weight. Icterus resulted from the consumption of tissue to maintain body-warmth. It was furthered by a lack of water in the organism and was often observed in weak, premature, or sick infants. It was also seen in cases in which the meconium was slow in coming away. Artificially fed children increase far less in weight than do those who nurse.

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Death in the Puerperal Period, Tympany of the Uterus, and the Presence of Gas in the Blood.—SCHNELL reports from the clinic at Würzburg (*Monatsheft für Geburtshülfe und Gynäkologie*, 1896, Band 4, Heft 3) the case of a primipara who had a tedious labor under the care of a midwife. When she came under observation it was found that a transverse presentation existed in a simple flat pelvis. It was impossible to make version because of the tetanic condition of the uterus. Accordingly the patient was admitted to hospital, and given morphine and warm applications to the abdomen. Tympany of the uterus gradually developed. A very difficult version was finally made, and an abundance of gas dislodged from the uterus. It was necessary to perform craniotomy on the after-coming head. The amniotic liquid had a foul odor. The child was a large one, and partly macerated. The patient died of shock shortly after. On post-mortem examination the great vessels at the base of the heart contained blood mixed with gas. The same condition was present in the pericardium, in the lungs, spleen, and liver, and to a less extent in the abdominal aorta. It was thought that the presence of the bacillus coli communis was responsible for the decomposition present.

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The Relationship between Myoma of the Uterus and Sterility.—HOFMEIER (*Berliner klinische Wochenschrift*, 1896, No. 43) publishes a paper in which he gives the statistics from his hospital and private cases, and is led to conclude that myoma of the uterus does not in itself cause sterility. His analysis of statistics is very minute, and the conclusion seems inevitable. He finds in a number of cases that sterility was present during the first five years after marriage, before a myomatous tumor could be detected. It is only exceptionally that the direct influence of the presence of the tumor in producing sterility can be proved. He reports a number of cases in which the tumor disappeared during the puerperal state without interference.

PÆDIATRICS.

UNDER THE CHARGE OF

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ASSISTED BY

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Nephritis in Infantile Scurvy.—THOMAS (*Boston Medical and Surgical Journal*, September 3, 1896, p. 230) calls attention to the frequency with which blood or albumin, or both, has been found in the urine in reported cases of infantile scurvy. He is inclined to think that kidney-trouble of greater or less severity would probably be found in all, or nearly all, of the cases if a microscopic examination were made during the early stages of the disease. In certain cases of Gee, Thompson, Barlow, and Sir William Roberts the kidney-trouble seems to have been the only symptom of the disease.

The author reports a case showing marked disturbance of the kidneys, which, while not the only symptom present, was the first and most marked one. The patient was a girl of healthy parentage, fed from birth upon the bottle. At the age of three weeks she had been overfed by the nurse and began to suffer from digestive disturbances. She was fed upon modified milk until at the age of six months she had an attack of diarrhœa, which yielded after a change in the formula of the milk. After this she failed to gain ; each time the food was made more nourishing the digestive trouble returned. Finally malted milk was given in alternate feedings with the modified milk, and the child began to improve. At the age of seven months malted milk alone was given, with half an ounce of cow's milk or cream in each feeding. She continued to gain until eight and one-half months old, when she began to take food badly, was feverish, and passed a smaller quantity of urine than usual, which stained the napkins a dark color. The feverish symptoms subsided in a few days. The urine, now examined for the first time, was distinctly red in color, acid in reaction, of a sp. gr. of 1012, and contained a trace of albumin and much blood. The microscope showed normal and abnormal (shadow) red corpuscles, numerous leucocytes, a few renal cells, and very rarely a hyaline cast. The next day the gums about the four central incisors were swollen and red. The food was now changed to a mixture of milk, cream, and water, unsterilized, with beef-juice and orange-juice. The general condition quickly improved, but it was five weeks before the urine was perfectly normal.

The author therefore feels warranted in concluding that in infantile scurvy the kidneys are probably affected in a large proportion of the cases, at least during the acute stages, and that this catarrhal nephritis is probably caused by the presence of an irritant in the blood, which by its effect upon the walls of the renal vessels produces hemorrhages ; that cases occur in

which the renal symptoms are the first, or perhaps the only ones observed ; and that in suspected cases the condition of the urine may lead to an early diagnosis and possibly to the prevention of severer symptoms of the disease.

Conclusions Concerning Lumbar Puncture.—WENTWORTH (*Boston Medical and Surgical Journal*, August 6, 1896, p. 139) presents a valuable experimental study of lumbar puncture founded upon twenty-nine cases. His conclusions are quoted as follows :

1. The normal cerebrospinal fluid contains neither cells nor fibrin and is perfectly clear.

2. In cases of meningitis the cerebrospinal fluid is invariably cloudy when withdrawn. The degree of cloudiness is to some extent proportionate to the amount and character of the exudation in the meninges.

3. The cloudiness is caused by cells. The character of the cells differs with the variety of meningitis. After withdrawal more or less fibrin is formed in the fluid. The presence of these cells and fibrin is pathognomonic of inflammation in the meninges.

4. The cloudiness is oftentimes so slight that close observation is necessary to detect it.

5. The operation is not difficult to perform on infants and children. It is not dangerous, if strict cleanliness is observed.

6. The differential diagnosis between the various kinds of meningitis can be made by microscopic examination of the sediment, by cultures taken from the fluid, and by inoculation-experiments.

7. Inoculation-experiments afford the surest means of determining tubercular meningitis. They are of value to distinguish between the varieties of meningitis in order to determine if tubercular meningitis is recovered from.

8. In the normal fluid a faint trace of albumin is usually present, about one-fiftieth of one per cent., or less, by quantitative analysis. In meningitis the amount of albumin is increased, and has varied from one-thirtieth to one-tenth of one per cent.

9. In one case a diagnosis of general infection with the staphylococcus pyogenes aureus was made from cultures taken from the cerebrospinal fluid.

The Action of Streptococci upon Diphtheria-cultures.—By mixing cultures of the streptococcus with those of the Klebs-Loeffler bacillus BOX-HOFF (*Hygienische Rundschau*, 1896, No. 3, S. 97) has observed a considerable increase in the virulence of the latter. The dose necessary to kill a guinea-pig was much less than that required for a culture of the diphtheria-germ. If the dose was decreased to the point of permitting life for two to three weeks, there was observed, besides emaciation, a diminution in the secretion of urine, which became sanguinolent. The autopsy showed especially profound alterations in the kidneys visible to the naked eye. The glomerules were swollen and projected above the cut surface. The microscope showed the shedding of epithelium from the urinary tubules and the presence in their lumen of numerous altered red globules. These lesions cannot be obtained with pure cultures of the streptococcus, but only by adding to the diphtheria-cultures the toxins of streptococci obtained from cultures four weeks old.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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New Culture-media for the Gonococcus.—The medium originally proposed by Wertheim for the cultivation of the gonococcus consisted of one part of human blood-serum obtained from the placenta and two parts of ordinary nutrient agar. While this medium is still recognized as being eminently well adapted to support the growth of the gonococcus, the many practical obstacles standing in the way of obtaining human blood-serum deprive it of any extended usefulness, and experiments with the blood-serum of animals have shown it to be less well adapted to the purpose. In 1893 Menge suggested the contents of cysts and hydrosalpinx-fluid as a substitute for blood-serum, and Neisser obtained an abundant growth on a mixture of agar and sterile exudate from a gonorrhoeal joint. Since that time all manner of exudates and transudates have been employed. Of these it would seem that the "chest-serum" of HEIMAN (*New York Medical Record*, June 22, 1895) is the most readily obtainable and yields the most abundant growth. This last fact is explained by Heiman as due to the high serum-albumin content of the pleural exudate.

Heiman's medium is substantially the same in its proportions as Wertheim's. One part of liquid chest-serum, which has been sterilized in test-tubes by heating repeatedly to 149° F., is mixed at the time of plating with twice its volume of nutrient agar which has previously been melted and allowed to cool again almost to the point of solidification. The mixture is poured into sterilized Petri dishes, and after solidification is inoculated in the usual way. The nutrient agar recommended is the ordinary beef-broth with pepton and with or without salt, to which 2 per cent. of agar-agar has been added.

As another medium well adapted to the growth of the gonococcus, McCANN (*The Lancet*, May 30, 1896) recommends the liquid contents of ovarian cysts. The fluid is drawn into sterilized, stoppered glass cylinders, is set away in an ice-box to allow impurities to settle, is transferred to test-tubes, and is slowly coagulated by being heated for four hours at a temperature between 150° and 154° F. A translucent, clear, solid medium should be the result, whose sterility should be tested before using. The growth of the gonococcus upon this medium is described by McCann as being very abundant and characteristic.

Formalin as a Preservative for Gross Specimens.—Among those interested in the preservation of gross pathological specimens for museums or demonstration the desire has always been felt for a preservative which, with-

out making the preparation transparent or destroying it in any way, should still preserve the natural color of the tissues. One of the earliest uses to which formalin was put was, therefore, to the preservation of such material, and it was found to yield most satisfactory results as a preservative, causing little if any shrinkage and being relatively cheap. But after a time the color of the tissues underwent a disappointing change, owing to changes in the blood contained in them.

To obviate this difficulty JORES (*Centralblatt f. Pathologie*, 1896, vii. No. 4, 134) has experimented with a number of preservative mixtures consisting of formalin and various proportions of a number of salts known to have the quality of preserving the color of hæmoglobin. As the result he advocates the use of the following method:

The tissues are preserved in a solution containing 1 part of sodium chloride, 2 parts of magnesium sulphate, 2 parts of sodium sulphate in 100 parts of a 5 or 10 per cent. solution of formalin. After sufficient hardening they are washed in 95 per cent. alcohol, and are then immersed in 95 per cent. alcohol until thoroughly penetrated by it, after which they are permanently preserved in a mixture of equal parts of glycerin and water. During the immersion in the formalin solution there is a change of color, but return of the original color occurs when the specimen is penetrated by the alcohol, and remains unless the action of the alcohol be too long continued. It should be stopped as soon as the preparation is thoroughly penetrated.

Specimens preserved in this way by Jores are said to have perfectly retained their natural color at the end of nine months, and have also shown themselves to be suitable for microscopic examination at the end of that time. For this purpose the glycerin and water are washed out in strong alcohol (absolute is recommended) and the specimens are imbedded in celloidin or paraffin.

RAPIDLY OCCURRING HEMIPLEGIA IN ACUTE LEAD–POISONING.[1]

By J. M. DaCosta, M.D., LL.D.

On November 10, 1896, I was asked by Dr. Theodore Gruel to see a case of paralysis of rapid onset and obscure origin. I found the patient to be a lady, thirty-five years of age, a brunette of fine physique, unable to walk, and scarcely able to stand without assistance. She had been still more helpless, but lately had been improving. Her previous history was one of almost uninterrupted health, the only illness being an attack of pneumonia four years ago, followed by albuminuria, from which she recovered on going to a southern climate. She never complained of anything, but, on questioning as regards susceptibility, spoke of being susceptible to poison-vine. She spent the summer at the seashore, and came back to her home in the best of health. Shortly after her return it was determined to paint some rooms in the house, though not the one in which she slept, and the house throughout became filled with the odor of fresh paint. She began, almost from the first day, to complain of headache, and three days after the painters had been at work the headache had become so violent and she felt so ill that she sent for her family physician, Dr. Gruel. He found her much worse than had been supposed. Her speech was thick; the tongue was slowly protruded and deviated to the right; there had been vomiting. The right arm and leg were much impaired in their motion, the leg more so than the arm, and this loss of power was preceded by a feeling of numbness. The right side soon became still more helpless, and the patient was forced to remain in bed. Shortly after the right side was affected, numbness and a sense of coldness on the left side were complained of; but there was never any motor weakness on that side. The sense of coldness and numbness on the left side yielded in about one week to alcohol-sponging and to frictions with a Turkish towel, and her general

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condition became decidedly better under repeated free purgation with sulphate of magnesia and under strychnine. In the progress of the case before I saw her it was observed that, while the paralysis of the right arm improved, things dropped out of her right hand; that the eyesight was very dim and its impairment much complained of; that there were no pains in the arms or legs, or joints, or in the abdomen; that the urine, examined from the start, was of high specific gravity, 1025 to 1040, but free from albumin and sugar; that the temperature was normal; and that there were no psychical disturbances, to which, indeed, neither she nor any of her family had ever been liable. The mother, it was ascertained, had a very great susceptibility to poisons of all kinds.

When I visited Mrs. O. with Dr. Gruel for the first time, four weeks after the paralytic attack, I found a well-nourished woman sitting in a chair, but still hemiplegic. The right arm could be feebly moved, but the grasp of the hand was very weak; the right leg was powerless. There was neither wrist-drop nor foot-drop, nor tremor, nor muscular atrophy. No facial paralysis existed, and the tongue was protruded straight. The knee-jerks were exaggerated, that on the right side markedly so. There was also an increased reflex in the forearm, both on tapping the flexors and the extensors. In the course of the musculo-spiral, the radial, and the nerves in the legs no spots of tenderness were detected. There was no anæsthesia to touch or to pain. Tactile sensation in the fingers of both hands was well preserved, and heat was readily distinguished from cold. The muscular sense was not tested, nor were the electric reactions, though I learned subsequently from Dr. Gruel that the muscles on both sides responded well to faradization, and that the electric sensibility was normal. There was no disease of the heart. The breath had a peculiar, mawkish odor, and, in a strong light, we found an undoubted bluish line on the gums, especially around the lower incisors on the left side.

Convinced that she was suffering from lead-paralysis, we placed her on iodide of potassium. The strychnine was stopped, the sulphate of magnesia continued as a laxative, and, after about a week of this treatment, the urine was sent by Dr. Gruel to Professor Fetterolf, of the University, for examination. The report returned says, "No albumin, but lead present."

On December 24th I saw Mrs. O. again, and learned from Dr. Gruel that her progress had been uninterrupted. There had been no return of headache; indeed, the headache had passed away a few days after the seizure. The grasp of the right hand was greatly improved, though it was still not so strong as that of the left. She could now play on the piano; not, however, as well with the right hand as with the left. The sensation to touch was good in both hands; the tactile sense, tested with sharp points, seemed perfect, and was as good in the right hand as in the left; there was no diminished temperature-sense in either hand. No disorder of sensation in the legs was discernible; the motion of the right leg was not quite restored; she still dragged it a little, but she walked unassisted, even with her eyes closed. The knee-jerks were good; they did not seem any longer exaggerated. A faint bluish discoloration was still noticeable on the gum of the lower jaw. The heart-sounds were distinct; the digestion was excellent; the eyesight was fully restored; indeed, her recovery was almost complete. She had been

taking 30 to 45 grains of iodide of potassium daily since our first visit together. This we directed to be decreased and soon discontinued, and strychnine to be substituted. Systematic massage and faradization of the affected muscles were to be employed.

I am induced to put this case on record by its extreme rarity. As a rule, the publishing of isolated instances of disease is of little value; but here is one in which a woman in robust health is in three days so completely poisoned by lead that she becomes paralyzed. The form, too, of the paralysis is most unusual and its onset remarkable.

Let us first take notice of the rapidity of the poisoning. Almost from the first there is headache; after three days' exposure, paralysis, preceded by some disorder of sensation, but without colic or other abdominal symptoms except vomiting and moderate constipation. Three days is a very short time for any sign of lead-poisoning to manifest itself in, even the ordinary one of colic. Yet here we have the nervous system at once affected without preceding colic or any of the usual general symptoms of lead-poisoning. As regards the nervous system being disordered without colic first happening, the case, although unusual, is far from standing alone. In 102 cases analyzed by Tanquerel des Planches in his classical work, fourteen had not antecedent colic. It is true that the paralysis he means is for the most part the usual one of the extensors of the arms. Trousseau mentions an instance of lead-paralysis in which there was no prior colic. In three of Tanquerel's[1] cases colic followed the paralysis. But in the rapidity with which the nervous system became involved, the case I have detailed is, I believe, without precedent; at least I am not able to find one. The most rapid cases I have any cognizance of are three alluded to by Tanquerel, in which, eight days after exposure to lead, paralysis followed; here, too, the context points to the ordinary local lead-palsy. In critically examining cases of rapid development we must not overlook the fact that a person may absorb lead slowly into the system for a long time, as through impregnated drinking-water or hair-dyes, and then another and different exposure, to fresh paint, for instance, produce sudden and overwhelming manifestations. This happened in the cases reported by Chapin,[2] in which acute symptoms of lead-poisoning showed themselves in the children of a painter after being only eight days in a freshly painted room, they having been, however, during two years exposed to a pot of white-lead kept in an adjoining room. In the case of Mrs. O. there was no history whatever of previous exposure, and, as already stated, she, with the rest of the family, returned from the seashore in perfect health.

The form of paralysis in the case under discussion requires special notice. It was that rarest of all as the result of lead—hemiplegia.

[1] Traite des Maladies de Plomb, t. ii. p. 19.   [2] New York Medical Record, 1884.

Moreover, it was not attended, at least not when it came under my observation, with anæsthesia, though the hemiplegic form is generally associated with hemianæsthesia. Cases of hemiplegia from lead are spoken of by some of the older authors, as by Stoll and Andral; Tanquerel[1] mentions having met with one. Raymond[2] describes a case in a man thirty-six years of age. The extensor muscles were first affected, and the palsy was preceded by violent colic. With the hemiplegia there was anæsthesia. Oliver[3] refers to an instance of right hemiplegia with aphasia. Often what is described as hemiplegia from lead is not a true hemiplegia, but is a general paralysis of incomplete character, especially in the legs, in which the loss of power has almost entirely or entirely passed off on one side at the time the patient is first seen. In the hemiplegia, as well as in the paraplegia, from lead the muscles of the upper extremities are generally more affected than those of the lower. Jaccoud[4] tells us that this is the case in all lead-palsies in the proportion of 5 or 6 to 1. In children, however, as the observations of Putnam,[5] Sinkler,[6] and Newmark[7] prove, the palsy is more apt to be in the lower extremities. In this respect the instance of paralysis narrated in this paper is more like the lead-palsy of childhood than of adults.

From an analysis of the features of this case, and of the few that I am able to find recorded in medical literature, the clinical picture of saturnine hemiplegia of acute form is that of a hemiplegia suddenly, or rather suddenly, developed, prodromes of headache and weakness of extensor muscles in arm and leg having existed or not. The hemiplegia deepens after its onset; there is with it anæsthesia or some other disorder of sensation on one or on both sides. But this is capricious and apt to pass off before the impaired motion does. The hemiplegia is associated with excessive reflexes. This combination of symptoms is in itself significant, and is valuable, irrespective of the history of the case and the ordinary manifestations of the presence of lead in the system.

From these hemiplegias of acute or subacute origin we must separate those that come on where the system has been long impregnated with lead, and secondary changes in bloodvessels, heart, kidneys, or brain have been slowly wrought. A hardened vessel gives way, and cerebral hemorrhage with one-sided paralysis occurs. Instances of the kind are mentioned by Mathieu and Malibran,[8] and by Létienne.[9] Landowzy[10] details an autopsy in a printer who had right-sided hemiplegia and had frequently suffered from lead-colic. Besides the evidence of an old clot

[1] Op. cit.   [2] Gazette de Paris, No. 30, 1876.
[3] Med.-Chir. Trans., vol. lxxiii. 1890.   [4] Pathologie Interne.
[5] Article Lead-poisoning in Cyclopædia of Diseases of Children, and Boston Medical and Surgical Journal, February, 1893.
[6] Medical News, July 28, 1894.   [7] Ibid., May 11, 1895.
[8] Progrès Médicale, October, 1884.   [9] Arch. gén. de Méd., vol. i. 1892.
[10] Bullet. Soc. Anat., 1877.

in the brain, a descending medullary sclerosis was found. In Mona-kow's[1] case, a printer, who had had chronic lead-poisoning for thirty-five years, a right-sided hemiplegia due to cerebral hemorrhage happened some months before death, and atrophic and sclerotic lesions existed in the upper part of the spinal cord. In Rosenthal's case[2] of right-sided hemiplegia in a house-painter an extravasation of blood on the left side of the brain, with rigidity of the arteries at the base, was observed at the autopsy. In the remarkable group of saturnine encephalopathies described by Berger,[3] to which Dr. Stewart called my attention, occur-ring in a family of potters, with an evident predisposition to nervous diseases and apoplectic seizures, there were four who, while suffering from chronic lead-poisoning, had hemiplegic attacks due, with one probable exception, to cerebral hemorrhage.

There is little difficulty in distinguishing the hemiplegias due to lead from other palsies produced by lead. Most cases of paralysis from lead-poisoning, with or without the familiar wrist-drop, are owing to a degen-erative neuritis, and the bilateral character of the palsy in the arms, its gradual spread, should it become general, the wasting of the muscles, the localized pains, the impairment or loss of faradic irritability, are very significant. The knee-jerks and plantar reflexes are usually much weakened or lost in extensive neuritis due to lead; yet too much stress cannot be laid on this point as a mark of distinction, for, as Hale White's[4] case proves, they may be very active. With reference to the hemiplegias that occur in chronic lead-poisoning yet are not, strictly speaking, saturnine, but due to cerebral hemorrhage, they may be discriminated by the history of long-continued lead-poisoning; by the signs of diseased arteries, heart, or kidneys; and by the sudden and complete loss of motion in the apoplectic attack—much more complete than occurs in saturnine hemiplegia. On the other hand, the disturb-ance of sensation is absent, or far less pronounced in the apoplectic cases. As a rule, too, the electro-muscular contractility is not so well preserved, owing to the saturation of the system with lead; but the electrical reactions are not conclusive in distinguishing between these forms of hemiplegia in lead-poisoning, nor are the reflexes. On the whole, the distinction is generally not difficult. Yet that it may be so is proved by an instance mentioned by Duchenne as occurring in Trous-seau's clinic, which that master regarded as purely saturnine. There was normal electro-muscular contractility and sensibility, and at the autopsy an extensive clot was found on one side of the brain.

In the instances of paralysis of acute onset, such as the one described

[1] Archiv für Psychiat., vol. x. Part 2.
[2] Elektro-therapie, ii. Aufl. 32, Beob.; also referred to in Nervenkrankheiten, p. 607.
[3] Berlin. klin. Wochensch., March, 1874.
[4] Transactions of the Clinical Society of London, 1893.

in this paper, it is not likely that any structural disease in the brain other than local alterations of the circulation and some effusion exists. The disturbance is caused by the lead circulating in the blood and acting on motor centres or motor paths as a poison, directly, or by changes produced in the blood, though the further thought of a thrombosis or of minute embolisms from the altered blood suggests itself. We have no positive evidence in these hemiplegias that there is no anatomical change in the nervous textures; we can only reason from analogy from what has been observed in other encephalopathic affections of quick development that there is none. Thus, Oliver[1] extracted lead from the brain in cases of lead-poisoning in which death was rapid, but found the brain-substance pale, œdematous, and soft, with accumulation of subarachnoid fluid, and membranes normal, or the veins gorged. In Stewart's cases,[2] dying in convulsions, lead was found in the brain, but there were no marked signs of disease beyond those of congestion. Trimborne,[3] in a case resembling tubercular meningitis, found the brain to be intensely anæmic. The part of the brain for which lead has a particular affinity is indicated by the researches of Maier[4] to be the cortex.

This paper is offered as a contribution to a subject which, however ardently it has been worked at, still presents itself constantly in new or in complicated and rare forms.

ON THE TREATMENT OF GRAVES'S DISEASE BY MEANS OF THYMUS GLAND.

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DURING the last year and a half a number of cases of exophthalmic goitre treated by thymus gland have been published in the medical journals in various parts of the world. I have been frequently asked to give my opinion as to the value of this mode of treatment, which I have been employing in a certain number of cases for two years. I have hitherto refrained from doing so, because I was anxious to give the method a fair trial and was conscious that nothing was easier than to draw erroneous conclusions as to the effect of remedies in such a malady as Graves's disease.

Every physician who has had much experience of this disease will

[1] Med.-Chirurg. Transactions, vol. lxxiii. 1890.
[2] Phila. Med. Times, June and December, 1887, and January, 1889.
[3] Centralblatt für klinische Medicin, March, 1891.
[4] Virchow's Archiv, vol. xc.

agree with Möbius when he exclaims regarding the effects of drugs upon it, "*Wie viel Täuschung bereiten therapeutische Versuche!*" I think, however, the time has come when I should put on record some account of the cases treated by this method and endeavor to arrive at some conclusion as to whether the thymus gland has any decided therapeutic action or not on the symptoms or course of this disease.

My attention was first called to the subject by reading an account of a case, published by Mr. David Owen, of Manchester, in which great benefit was stated to have followed enormous doses of thyroid gland, the largeness of the dose having been due to a mistake on the part of the butcher. The dose amounting to one-quarter of a pound, I was convinced that so much thyroid was not likely to have been supplied by a butcher by mistake, and I pointed out to Mr. Owen that quite a large number of sheep's thyroids would be necessary to make up a quarter of a pound. Mr. Owen then, on investigating the matter, found that it was a thymus and not thyroid which had been given. Mr. Owen published a further account[1] of the case, stating this and endeavoring to explain the mode of action.

The total number of cases so far recorded, treated in this way, which I have been able to find, amounts to thirteen. I am able to add to this number two treated by Dr. Metcalfe, of Newcastle, of which he has kindly sent me the particulars, bringing the number up to fifteen. The cases treated by myself, which I propose to publish in this communication, amount to twenty.

The one symptom which, above all others, I have found almost quite uninfluenced by remedies of any kind is the rapid action of the heart. No drug with which I am acquainted can be depended on to reduce the frequency. Constantly, when the other symptoms have subsided and the general health has greatly improved, I have found the heart still beating quickly. If it were, therefore, found that under the influence of thymus the heart was conspicuously slowed down, I should attach great importance to this fact.

Next to rapidity of heart, the exophthalmos is the most obstinate symptom. I do not know of any drug which has any effect on it. True, it generally abates, sometimes entirely disappears, as the disease passes off; but frequently permanent prominence of the eyes remains. If thymus produced rapid diminution of exophthalmos, I should also attach great importance to this.

The effects of a drug on the thyroid gland are much more difficult to study. In the natural course of Graves's disease the goitre frequently progressively diminishes, and in a late stage no enlargement may be perceptible. On the other hand, it frequently fluctuates in size, enlarging at menstrual periods or under other conditions. While, therefore, thymus was being given, if the goitre enlarged, I should not consider

the drug could have much specific action ; and if, on the other hand, it
diminished, I should not feel justified in attributing this result to the
drug without other evidence.

I consider it very unsafe to draw conclusions from general improve-
ment in the condition and state of nutrition of the patient.   This so
frequently occurs, whatever mode of treatment is carried out, as well
as when no treatment at all is employed, that it must be considered in
most cases as a natural result, and not as the effect of drugs.

It is idle to speculate as to the mode in which thymus influences
the disease until it is established that it does influence it.   Previously to
trying thymus I had tried the effect of thyroid and several other animal
tissues in this disease.   I did not try the thymus on account of the fact
that this gland is frequently found to be persistent in fatal cases.

From this fact I did not anticipate any likely therapeutic action.
The last of my series of cases treated by thymus gland is specially
interesting on account of the persistence of the thymus gland, and the
fact that histological examination showed it to present the structure of
a functionally active gland.

Those who are interested in speculations as to why the thymus should
prove useful may read Mr. Owen's second paper, already referred to, or
an article by Dr. Metcalfe,[2] who, starting with the assumption that the
thymus is the specific for Graves's disease in the same way that the thy-
roid is for myxœdema, proceeds to give a very ingenious explanation
of how it acts.

Before relating the results of my own experience I shall very shortly
review the cases recorded by others.

CASE I.   Observer, D. Owen.[1]—Male, laborer, aged forty-six years.
Duration twenty years.   Exophthalmos marked ; goitre slight ; pulse-
rate 126.
    Treatment.   One-quarter pound of sheep's thymus daily for two days,
and then, after a week, given in doses of a quarter of a lobe daily.
Steady improvement.   The exophthalmos and the fulness in thyroid
region disappeared.   Pulse-rate reduced to 76.   Patient became able to
do heavy work without the slightest discomfort.   On discontinuing the
treatment gradual return of some of the symptoms, viz., palpitation
and loss of energy, which disappeared on resuming the thymus.   The
amount found necessary to keep him in health was one lobe once a week.
    CASE II.   Observer, J. Mikulicz[1] (Breslau).—Female, aged forty-four
years.   Duration many years.   Exophthalmos to a high degree ; goitre
large since seventeen years of age ; pulse 120–132 ; usual nervous
symptoms ; systolic murmur.   Admitted to hospital for stridor and
symptoms of tracheal pressure.
    Treatment.   Sheep's thymus at first in small, later in large doses ;
375 grammes taken in six weeks.   *Effects :* striking improvement ; ex-
ophthalmos lessened ; goitre unchanged ; pulse-rate reduced 20–30
beats per minute ; stridor and dyspnœa only troublesome on exertion ;
greater capability for exertion than for many years.

Cases III., IV., and V. Observer, R. H. Cunningham, M.D.[5]

Case III.—Female, aged twenty years. Duration two years. Exophthalmos fair amount; goitre moderate; pulse 124; insomnia.

Treatment. Lamb's thymus slightly broiled (amount not stated). Improvement after a few days. She then went to a neighboring State, and it is not recorded whether she continued to take the thymus or not. Gradual improvement. Five months later no exophthalmos, no goitre, pulse 72, general condition excellent.

Case IV.—Male, age not stated. Duration four years. "Prominent eyes;" goitre slight; pulse 100–110; severe insomnia.

Treatment. Irregular administration of lamb's thymus, slightly cooked, for two weeks. Result: eyes gradually became less prominent; pulse fell to 78; general condition improved.

Case V.—Female, age and duration not stated. "Usual symptoms;" goitre marked; pulse 124.

Treatment. Twelve to fifteen 5-grain tabloids of thymus daily; goitre very considerably decreased in a week; pulse in two and a half weeks 96, but readily mounting to 120 after moderate exertion; increased energy and strength.

Case VI. Observers, MM. Taty and Guérin[6] (Lyon).—Woman, age and duration not stated. Well-marked symptoms; goitre; mental trouble.

Treatment. One and one-half kilos of calf's thymus administered in two months. No effect on goitre, tremors, or nervous symptoms. Loss of weight 2.6 kilos.

Case VII. Observer, Robert J. Edes, M.D.[7]—Female, aged thirty-four years. Duration a few months, but history of goitre cured by electricity several years ago. Prominent eyeballs; goitre small; pulse rapid and irregular; great nervous restlessness, bodily and mental.

Treatment. For eight months various remedies tried, without benefit. Pulse never below 104, but, on the whole, gain of flesh and diminution of restlessness. Then treated with dried aqueo-glycerin extract of thymus, 4½ grains per diem. Relieved, but no very obvious change in the symptoms in three weeks. Continued treatment three months: goitre less; pulse 92–108; restlessness diminished.

Case VIII. Observer, Norman J. McKie, M.D.[8]—Female, aged thirty-nine years. Duration three years. Exophthalmos gradually increasing; never much enlargement of thyroid; pulse-rate generally 90 at least; symptoms soon yielded to rest and tonics in August, 1892. At Easter, 1895, treatment desired on account of prominence of eyes.

Treatment. Thymus-tabloids (5 grains), at first one, then two, and next three daily, after food. In three months exophthalmos nearly disappeared. Pulse-rate 75. On stopping treatment exophthalmos returned. Tabloids resumed, with noticeable benefit in a short time.

Cases IX., X., and XII. Observer, Arthur Maude.[9]

Case IX.—Female, age not stated. Duration eight years. Every known symptom with great severity; goitre large and increasing; gastro-intestinal attacks severe and prominent.

Treatment. Thymus-tabloids (10 grains) twice a day for several weeks. No effect. Then 45 grains given per diem. Rapid improvement, but repeated relapses on leaving off the tabloids. Amelioration of all signs. No effect on goitre.

Case X.—Female, aged thirty-nine years. Goitre since childhood.

No mention of exophthalmos. Symptoms: tremors, excessive muscular weakness, cardiac disturbance six years.

Treatment. Thymus-tabloids (15 grains) twice a day for two months. Result: great improvement of all symptoms, especially tremor and loss of muscular power.

CASE XI.—Female, aged forty-seven years. History of Graves's disease at seventeen years of age, with complete recovery after a few years. Always emotional and excitable. Slight proptosis and occasional thyroidal swelling, November, 1894. No disturbance of heart until January, 1896. Sudden death of husband in May, 1896, caused outburst of all the usual symptoms. Steady improvement under administration of fluid extract of thymus for two months. Dose not stated.

CASE XII.—Female, aged fifty years. Goitre since eighteen years of age. No signs of Graves's disease until the age of forty-six years. All the usual signs with various nervous symptoms. November, 1895, sudden profuse hæmatemesis, after rallying from which treated with 45 grains of thymus-tabloids three times a day for a month. Remarkable improvement.

CASES XIII. and XIV.   Dr. G. Metcalfe, of Newcastle-on-Tyne.

I am indebted to Dr. Metcalfe for permission to give particulars of these two cases, which have not, I believe, been previously published.

CASE XIII.—Female, aged forty-five years. Duration of main symptoms twelve months, but palpitation three years, since shock resulting from sudden death of her sister in her presence. Exophthalmos marked and goitre moderate; pulse 120; great emaciation and anæmia, along with the usual nervous and mental condition.

Treatment. At first bromide, belladonna, and arsenic with no benefit. Then sheep's thymus two ounces a day, slightly fried in butter, started April, 1895. After a month of this treatment distinct improvement. Seven pounds in weight gained between the middle of May and middle of June. By August, the signs of Graves's disease had almost wholly disappeared. Maximum pulse-rate 90; no palpitation; no exophthalmos; no enlargement of thyroid. In December, 1895, strong and robust, well nourished. The glands now only taken occasionally. No other medicines taken. When stopped no immediate effect, but after a month nervousness and palpitation return, subsiding on resuming the medicine. Very enthusiastic about the treatment and considers herself cured thereby.

CASE XIV.—Female, age and duration not stated. Marked exophthalmos; enlarged thyroid several years; palpitation and nervousness.

Treatment. Thymus gland ordered in September, 1895. In a month the thyroid gland was reduced to normal size, palpitation and nervousness had disappeared, and the ocular signs were gradually subsiding.

CASE XV.   Observer, Charles Todd, M.B.[0]—Female, aged twenty-two years. Duration three years. Exophthalmos moderate; goitre two years, size not stated; pulse 156, irregular; insomnia and palpitation troublesome.

Treatment. No benefit from the drugs ordinarily employed. Thymus-tabloids (30 grains a day) started September 30, 1895; gradually increased up to 100 grains a day. At the end of three weeks pulse 72, regular; exophthalmos less marked; goitre unaltered; improvement in general condition.

SUMMARY OF PRECEDING CASES. It will be seen from the preceding that the treatment was followed by considerable improvement in the patient in every case but one, viz., No. VI. In this case the calf's thymus was used in large doses, averaging about three-quarters of an ounce a day. In seven of the cases a very striking fall in the pulse-rate is explicitly recorded.

In three cases the exophthalmos disappeared, in one case it nearly disappeared, and in four cases it was lessened. In the remaining eight cases the result, as regards the eyes, is not specially mentioned.

As regards the goitre, in four cases in which it was large there was no change ; in four cases no effect is noted ; in three cases a slight enlargement disappeared ; in two cases there was diminution in size ; in one case the swelling was noted as never much, and in another as only occasional. Improvement in the general condition of the patient was noted in fourteen.

As regards the dose given, it varied between $\frac{1}{4}$ lb. and $4\frac{1}{2}$ grains in the day. Lamb's or sheep's thymus was given in six cases, in four slightly cooked and in two raw. In six cases thymus was given in the form of tabloids, and in two cases in the form of fluid extract. In the remaining case calf's thymus was given raw.

Large doses in two of the cases were successful where small doses failed. Two of the English firms who make thymus-tabloids inform me they use the calf's thymus, so that it is probable where tabloids were given that it was calf's thymus which was made use of. I have ascertained that the preparations used in Cases VIII., IX., X., XI., and XII. were derived from the calf. It must be borne in mind, in judging of the remedy, that it is probable it has been used without benefit in a considerable number of cases which have never been published. On this account it would be hardly fair to compare these cases, as I shall presently compare my own, with cases treated by other methods.

Dreschfeld,[11] in a recent article on Graves's disease, remarks that he has tried thymus gland in three cases without any marked benefit. Möbius,[12] in his recent work on Basedow's disease, mentions that he has treated several patients with slightly cooked calf's thymus for a shorter or longer time. They improved, but not more or sooner than under other modes of treatment.

I shall now proceed to relate the cases which I have treated myself, and shall then discuss them as a whole.

CASE XVI.—Woman, aged thirty-six years, admitted to St. Thomas's Hospital August 25, 1894. Goitre one year ; palpitation three years ; moderate proptosis ; pulse 104 ; slight tremors ; nutrition good. The patient was kept in bed for a week and the pulse quieted down gradually, successive records being 96, 84, 82, 76.

On September 2d she was given calf's thymus lightly broiled, but

could eat only a little of it. The same evening her temperature rose to 100.2°, having previously been normal.

On September 3d and 5th she had some more thymus, and on September 6th she had some freshly expressed thymus juice. Her pulse on these days was 84, 78, and 72, while her temperature kept normal.

On September 7th and 8th she had half a thymus; on the 12th six ounces of thymus; on the 13th four ounces; and on the 15th four or five ounces were administered. Her pulse on the 8th was 60; on the 10th, 72; on the 13th, 76.

On the 17th she had thymus again. She said she felt much better and stronger. No pain under the heart, no attacks of palpitation. The thyroid was slightly less prominent.

On September 20th, however, the pulse-rate was again 100; on the 21st, 112; and on the 22d, 96.

The patient left the hospital on the 27th, feeling better, the thyroid a little smaller, pulse-rate 76, but otherwise *in statu quo.*

Between September 1st and 8th she lost two pounds, but between September 8th and 25th she gained six pounds.

She was recommended to continue the treatment on returning to her home in Luton. I wrote subsequently to my friend, Dr. W. B. Tomson, of Luton, to inquire how she was getting on, and he informed me that the patient had not gone on with the thymus and could not be persuaded to do so, and that she had altered little since leaving the hospital.

CASE XVII.—C. K., single woman, aged twenty-five years. Illness commenced at the age of twenty years, with weakness and anæmia. About this time she had a great deal of anxiety and nervous strain, and swelling in the throat made its appearance. The swelling, at first small, quickly increased to more than its present size. A few months later she was very much troubled with diarrhœa, weakness at the knees, and palpitation. Her eyes at this time began to get prominent. She continued in bad health for about eighteen months. As she recovered, she began to suffer with severe pains at the back of her eyes, which came on once a week and have continued to trouble her up to the present time. She was so far restored to health that she was able to return to business for some eighteen months, but in November, 1894, all her symptoms returned, the swelling in the neck, proptosis, and palpitation being once more conspicuous.

She attended at St. Thomas's Hospital as an outpatient for a short time, and was admitted under my care as an inpatient on July 3, 1895. Her condition was then as follows: nutrition fairly good; eyes, marked proptosis; Von Graefe's sign present; considerable enlargement of thyroid, the right lobe being greater than the left; no bruit on auscultation; very rapid cardiac action, 160 to the minute, irregular and extremely forcible; no murmurs at apex; systolic murmur at the base; fine tremors of hands well marked; skin darker, especially on back, than ordinarily with persons of her complexion. After a few days' rest in bed the pulse quieted down to 102.

She was ordered one calf's thymus gland daily in the form of cold watery extract. She had this for the first time on July 8th, and subsequently had it fairly regularly for over three weeks.

The usual amount employed was eight or nine ounces. The patient expressed herself as feeling better while taking the thymus extract, but none of the objective symptoms appeared to be affected; thus the

exophthalmos, the goitre, the tremors, the looseness of the bowels, and the heart-rate remained as before. Thus on July 29th the pulse was 112. The patient left the hospital on August 4th, practically *in statu quo*.

The patient wrote to me on April 17, 1896, saying she was now feeling very much stronger, but some weeks was much better than others. The throat and eyes remained about the same, the heart palpitated very much at times, and she still suffered from shakiness and pains at the back of the eyes.

CASE XVIII.—Male, aged twenty-seven years; very marked exophthalmos; emaciation; rapid cardiac action; pulse 120, but no obvious thyroid enlargement. The patient was very tall and weighed 148 pounds.

He came under treatment on December 18, 1894, and was ordered three 5-grain tabloids of thymus three times a day, and 10 minims of tincture of belladonna. After fourteen days he said he felt stronger and better. Pulse 116. On January 1st he was ordered fifteen 5-grain tabloids a day. On January 15th pulse 120. Better on the whole, but some days well, others worse. He was then ordered belladonna and bromide. On February 19th his pulse was 96. He had considerably improved. His weight had gone up to 163 pounds, a gain of over 14 pounds.

CASE XIX.—C. T., female, aged forty years, attended September 4, 1895. She had a moderately enlarged thyroid, and complained of palpitation, trembling, attacks of fainting. No exophthalmos. Her pulserate was 112. For two months she was treated with a quinine and iron tonic; then, for two months, with belladonna and digitalis, and then again with an iron tonic. No distinct improvement in the goitre or symptoms. The goitre, indeed, slightly increased.

On March 11, 1896, I put her on extract of thymus, ℥j b. d. After six weeks' treatment no marked effect had been produced.

CASE XX.—Female, aged twenty-nine years, married. She had been under my care and observation four years with well-marked signs of Graves's disease. Duration of disease five and one-half years. Goitre, exophthalmos, palpitation, etc., all well marked. Course of disease characterized by remissions and exacerbations. In January, 1894, premature confinement at five or six months, followed by flooding, after which symptoms of disease were aggravated. Eyes very prominent, thyroid gland a good deal enlarged, tremors, breath very short, palpitation.

On September 25th pulse 104. Ordered three 5-grain tabloids of thymus three times a day. On October 2d pulse 96. General condition better; five 5-grain tabloids ordered three times a day for a week. Patient, however, did not attend again until January, 1895. She then said she had been better for a time, but her condition was again *in statu quo*.

CASE XXI.—Female, aged twenty-four years. *Forme fruste.* Small goitre; rapid cardiac action; pulse 120; tremors; no exophthalmos.

Ordered one 5-grain tabloid of thymus three times a day. This she took for eight weeks, at the end of which time no obvious improvement had taken place. Pulse still 120. She continued the treatment for six weeks more, without obvious effect.

CASE XXII.—A. B., female, aged thirty-four years, attended May 9, 1896, complaining of weakness and nervousness, prominence of the

eyes, want of energy, etc., for the last six weeks. She had a moderate enlargement of the thyroid; her neck measured thirteen and one-half inches in circumference. The neck had been swollen for four or five years. The exophthalmos was only slight. Pulse 126; weight 98 pounds, formerly 114 pounds.

She was treated with sod. phosph., gr. xv t. d., and extract of thymus (1 in 1), ʒij b. d. These she took for a month, and felt better for them, but there was no striking change in her condition.

CASE XXIII.—E. E., female, aged twenty-two years, attended February 19, 1896. Her throat had been enlarging for four years, and for the same time she had suffered from palpitation and nervousness. Her eyes had been prominent for two years. Pulse 122, regular. Moderate uniform enlargement of thyroid; neck-circumference thirteen and one-quarter inches; exophthalmos moderate. There was very considerable œdema of the legs. The urine contained a third of albumin. Her weight was 112 pounds.

Treatment. For the first seven weeks I treated her with tincture of belladonna, ♏x; sod. phosph., gr. xv t. d. The œdema soon disappeared and the amount of albumin in the urine greatly diminished. She increased 8 pounds in weight. The eyes became less prominent, but the heart still continued rapid. I next treated her with sod. phosph., gr. xv; extract of thymus, ʒj t. d. She took it for fourteen days without benefit. On May 6th I noted " Not so well; no strength; ravenous appetite; very thirsty; pulse 130. Thyroid considerably enlarged, measuring five inches across. Weight 121 pounds." On May 20th I again put her on the extract of thymus, which she took for two months, and appeared decidedly to improve in general condition. Her pulse quieted down to 98. The goitre slightly diminished, the neck-circumference becoming twelve and one-half inches.

CASE XXIV.—M. E., female, aged twenty-three years, single, servant, under my care off and on for nearly four years.

She first came under my care at the Royal Free Hospital in September, 1892. She had then been ailing about two months, having for that time felt tired and unfit for work. She had been noticed by her friends to have become irritable and nervous, although naturally not at all so. Her father had died suddenly about six months previously, and this had much affected her at the time. No previous illness; always strong and well until present attack. History of rheumatism in the family, patient's mother having had rheumatic fever three times, and sister having aortic valvular disease. Her condition at that time was as follows : " Nutrition fairly good; weight 106 pounds, in dressing-gown. When last weighed, about two years previously, she scaled 126 pounds. Eyeballs noticeably prominent, giving patient a wild, startled look. Palpebral fissure decidedly increased. Sclerotic seen both above and below the iris when patient looks straight in front. Glistening of conjunctivæ. Eyes quite covered by eyelids when the latter are closed. Von Graefe's sign absent. Thyroid moderately and uniformly enlarged; breadth four inches. Circumference of neck twelve and one-quarter inches. Uniform brown pigmentation of the whole body except the face. Heart rapid and irregular. Pulse 112.

The patient was kept in bed and treated with belladonna and a variety of other remedies. At first the thyroid increased somewhat in size, and then gradually diminished. The patient steadily increased in

weight from 106 pounds to 120 pounds. Throughout the whole period of her stay in the hospital, extending over four months, the pulse kept up about the same rate, between 112 and 120.

She subsequently attended under me as an outpatient at St. Thomas's. Very little exophthalmos and little enlargement of the thyroid remained, but the pulse-rate continued rapid.

On November 14, 1894, she returned, having been absent nine months. She stated she had not been so well lately. Her pulse was 120. No difference in eyes or thyroid. Weight 133 pounds. Face plump. I ordered her thymus extract (1 in 4), ♏xx t. d., and tincture of digitalis, ♏v t. d. She came back in a fortnight saying she felt better while taking the extract, the supply she had been given having, however, only lasted a week. Pulse 118. The mixture and extract were repeated for fourteen days. December 12th, pulse 138 ; both medicines repeated for three weeks. January 2d, pulse 120 ; she continued to take the same medicines for three months longer. She slightly increased in weight, going up to 138 pounds.

No marked difference was ever observed in the rapidity of the pulse. She was quite certain herself that the medicines made her feel stronger and better and less nervous.

CASE XXV.—Man, aged forty years, engine-fitter ; extremely marked case. Duration of symptoms six months. History of five attacks of influenza. Shock twelve years ago ; squeezed between railway buffers.

In July, 1894, patient found his neck increasing in size so that he was obliged to purchase larger collars. Within ten days the circumference increased from fourteen to sixteen inches. He also found that the exertion of walking up hill caused shortness of breath. Toward the end of September he sought medical advice, but gradually became worse. The breathing especially became more difficult, and he experienced a sense of suffocation, sometimes filling him with a dreadful sensation as if a strong hand were gripping him by the throat. As the neck was not increasing in circumference he thought the enlargement must be going on internally, and feared the consequences might be fatal. Walking up hill became almost impossible. On October 14th he was no longer able to continue his work, and became an inpatient of the hospital about October 27th. He was kept in bed and under treatment for a month ; the throat grew smaller and breathing easier, but he lost flesh and strength during that time. He then attended as an outpatient under me.

On December 5th I noticed extreme exophthalmos, upper lid much retracted. Emaciated ; weight, which was formerly 140 pounds, now 118 pounds ; marked tremors ; extremely fidgety manner ; thyroid uniformly and considerably enlarged ; circumference of neck sixteen inches ; pulse 160 ; great thirst and large appetite ; urine normal ; profuse sweating ; skin generally dark, muddy-colored. He was exceedingly weak and was obliged to have assistance to get about and to visit the hospital.

He was ordered extract of thymus (1 in 4), ♏xx t. d. On December 19th, when next seen, he was found to have lost six pounds in weight. His pulse was still very rapid, 150. The urine now contained a small amount of albumin. The thymus extract was increased to ʒss t. d. On January 2d he was found to have lost still more in weight, being

only 108 pounds. Pulse still 150. Urine, trace of albumin. The thyroid enlargement distinctly less. Neck now measured fourteen and one-half inches in circumference. Exophthalmos quite as well marked. Thymus extract continued in small doses.

On January 16th he reported that he had been bad all the past fortnight, especially with palpitation of the heart. Pulse 180 at first, 130 later. He felt he was getting weaker and weaker, and feared every visit would be his last. Thymus extract continued.

On January 30th still very weak and ill. During the last fortnight he had slight convulsive attacks which alarmed him very much. Further loss of two pounds in weight. Pulse 122–136. Urine, a trace of albumin. The thyroid enlargement still less. Neck now only fourteen inches in circumference.

He was ordered potassium bromide, gr. xv; tincture of belladonna, m̥xv; tincture of sumbul, m̥xx. A.M., P. ʒj t. d. in addition to the thymus extract. On February 14th, much better. No more convulsive attacks; weight as before; pulse 145; medicine and thymus repeated.

On February 28th looking and feeling decidedly better. Skin clearer; pulse 126; urine free from albumin; weight 107 pounds.

From this time the patient steadily improved. He regained weight, became stronger, less nervous, and had less and less palpitation. His pulse, however, continued rapid.

On April 24th I noted weight, 127 pounds; pulse 118; urine, no albumin; feeling fairly strong and able to be out of doors at work again.

He continued to take the same medicine until August 17, 1895. Weight now 130 pounds; pulse 92. A change was made in his medicine, the bromide and sumbul being omitted; but he did not feel so well, and after three weeks he was put back on the original mixture, the thymus being discontinued.

On October 12th his weight had further increased to 133 pounds. Pulse 110; eyes less prominent; face clearer and fuller. He looked very much better. Neck-measurement fourteen and one-half inches. At his own request he was given the thymus extract, ʒj t. d., in addition to the mixture.

December 14th, continuing in fairly good health. Weight 136 pounds; pulse 88. Thyroid enlargement rather greater again; circumference fifteen inches.

On January 4th the thymus extract was increased to ʒij b. d. January 25th, weight 137 pounds; pulse 86. February 15th, pulse 80; neck-circumference sixteen inches, and thyroid gland certainly larger. Belladonna and bromide mixture discontinued. Weight 136½ pounds. March 7th, thymus suspended. Pulse 88. Ordered red marrow extract and sodium phosphate. March 21st, not so well since medicine changed. Red marrow stopped. April 18th, pulse 104; weight 136 pounds; neck-circumference sixteen inches. Ordered extract of thymus (1 in 1), ʒij b. d. May 9th, pulse 118; weight 133 pounds; neck fifteen and one-half inches. May 30th, pulse 110; weight 133 pounds; neck fifteen and one-quarter inches. Has been working hard during the last week and feels more shaky.

CASE XXVI.—Woman, aged forty years. First came under treatment July 16, 1892. Usual symptoms of Graves's disease. The com-

plete original notes of her case have been lost, so that I am unable to give exact particulars as to the previous duration, causation, etc. The most marked feature of the case was the patient's extreme nervousness, characterized by tremulousness and excitability. Exophthalmos decided, but not extreme. Von Graefe's sign present. Thyroid enlargement moderate. Cardiac action rapid, 112 to 130. Heart, no evidence of organic disease. Patient was treated with belladonna for several months, with some benefit to her nervousness and general health. Various other drugs were tried, but she said none suited her so well. She looked and felt better and improved in nutrition. The eyes became less prominent, but the pulse remained persistently rapid, being generally 120.

I did not see her from April, 1893, to December, 1894, and during that time she enjoyed better health than she had done for a considerable time before she began to attend.

In December, 1894, I noted " moderate exophthalmos; slight Von Graefe's sign; pulse 136, tremulous; no distinct enlargement of thyroid now; weight 107½ pounds; skin muddy-colored."

I prescribed for her extract of thymus (1 in 4), ℥xx t. d. She continued to take this for four months. Her pulse during this time was generally much quieter than it had been while she attended previously, the records at intervals of three or four weeks being 104, 88, 92, 104. She looked and felt better, and her skin became clearer. Her weight remained the same. She attended subsequently from November, 1895, to March, 1896, when her heart was again troubling her and beating at the rate of 120 to the minute. For the first fortnight I treated her with extract of thymus, ℥j t. d.: her pulse fell to 96. I then treated her without the thymus, and her pulse varied between 120 and 108; but this fact was not surprising because she had sustained a fracture of the radius, which no doubt aggravated her symptoms.

CASE XXVII.—A. S., female, aged twenty-five years; married four years; one child living, aged three years; one dead, born five weeks before admission.

Palpitation commenced four years ago. Soon afterward the eyes commenced to get prominent, and gradually became markedly so. During the same time she has, in addition, been troubled with shortness of breath on exertion, nervousness, trembling, cramps in the legs, giving way of the knees, and diarrhœa. She has lost flesh to a considerable extent.

On admission, October 19, 1895, eyes very prominent. (" Three weeks previously the left quite came out, and had to be pushed back again.") Von Graefe's sign well marked. No enlargement of the thyroid, but some prominence of the upper part of the sternum. When the patient was previously under my care in July, 1894, there was then slight enlargement of the thyroid. Heart 126, quite regular; sounds healthy; abdomen much pigmented; walls flaccid, due to recent confinement; hands show fine tremors; urine normal.

During the first ten days the patient was kept at rest in bed, but no medicine was given. The pulse-rate varied between 100 and 134, the latter rate being noted on the 30th. She complained of palpitation occasionally, but otherwise had no subjective symptoms.

On October 30th she commenced to take ℥j of (1 in 4) thymus extract three times a day, being equal to 45 grains of thymus daily. On the 31st she complained of palpitation of the heart, which had kept her

awake most of the night. The pulse was very irregular, every fourth or fifth beat not being conducted to the wrist. Cardiac action 118.

On November 4th she complained of pains in the eyes and of dimness of sight; and on November 5th, on waking, she said she was unable to see at all. She also complained of aching pain on each side of her neck in the region of the thyroid gland, and also of pain at the back of the neck at the same level. On November 6th the thymus extract was discontinued. On the 8th the patient was ordered extract of belladonna, gr. ⅛ every six hours. She was kept in the hospital until December 29th.

From November 8th to November 30th the pulse, on the whole, was less rapid than previously; but during the whole of December it was rapid, varying between 130 and 102. No real improvement occurred in the eyes. The patient, however, before leaving the hospital stated she felt better, and that she did not get so easily tired as formerly.

The thymus treatment in this case was only carried out for a week, and the patient altogether had little more than three-quarters of an ounce of thymus during that time. It was discontinued because the patient seemed to be rather worse while taking it than she was before.

CASE XXVIII.—R. N., woman, aged twenty-five years, single, servant. Date of first attendance, May 8, 1895. Well-marked signs and symptoms of Graves's disease. Duration eighteen months. Decidedly better last nine or ten months than during first period of illness. Has had no treatment except for a fortnight for palpitation of the heart and weakness after an attack of influenza in January, 1890. Eyes, very marked proptosis; dislocation of right eyeball two months ago; got it back herself; never spasm; the right eyeball appeared to be rather the more prominent; Von Graefe's sign very well marked; thyroid gland uniformly and considerably enlarged; pulse 120 to 125; palpitation moderate; trembling has accompanied the palpitation; no marked loss of flesh; weight 110 pounds; looks well nourished; subject to flushings and heats, and feels better in cold weather; appetite good; no disturbance of digestive organs.

Patient was treated with tincture of belladonna, ♏x, potassium bromide, gr. xx t. d., for fourteen days without any change. Then, in addition, she was ordered extract of thymus (1 in 4), ℥j every night. She continued taking both for seven weeks. She said she felt decidedly better, but no change was apparent either in the proptosis, the size of the thyroid, or in the pulse-rate. The thymus extract was continued for five months longer, an alkaline tonic being given in addition. The thyroid certainly diminished in size, the neck losing an inch in circumference. The patient lost a few pounds in weight. The pulse continued rapid, 126, and the eyes remained quite as prominent. Her general condition certainly improved, and she felt stronger and capable of greater exertion.

CASE XXIX.—A. W., aged thirty-two years, married; one child, aged nine years; first attended August 25, 1894. She presented all the signs of Graves's disease in a marked degree. There was marked proptosis; the thyroid was much enlarged, the right lobe more so than the left; the pulse was 140; and the patient suffered much from palpitation.

She stated she had always been very nervous, and had suffered from headache, palpitation of the heart, and trembling, since childhood. Her

eyes had been prominent for the last two or three years, but she could not say definitely when they first began to protrude. In the beginning of 1894 she had violent pain in her chest, especially affecting the heart and left side. She consulted a doctor, and he presently noticed that the neck was beginning to swell. In addition to palpitation, she was much troubled with profuse sweating.

The patient had returned two years ago from Brazil, where she had been resident for eight years. During the last two years of her residence a revolution was going on, and the patient was much frightened by the firing, etc.

When a child she had measles, scarlet fever, and English cholera. She had also then frequent attacks of epistaxis. One of her brothers died of epileptic fits.

For the first five weeks the patient was treated with a mixture containing 5 minims of tincture of digitalis, which was taken three times a day. Her pulse-rate was as follows: September 8th, 116; 22d, 156; 29th, 84.

The exophthalmos was certainly less on September 29th than it was when she first attended, but the other signs were unaltered.

On September 29th she was ordered extract of thymus, $\mathfrak{m}$ xx t. d.; tincture of belladonna, $\mathfrak{m}$ x; inf. gent. comp., $\mathfrak{z}$j. A fortnight later the latter was changed to potassium bromide, gr. x; inf. gent. comp., $\mathfrak{z}$j t. d., as the patient complained of weakness of accommodation. She went on taking the thymus extract and the second mixture until January 12, 1895.

The heart continued to act rapidly, sometimes very much so. The trembling and sweating remained to a marked degree. The patient herself, however, stated that she felt very much better. The thyroid certainly diminished very considerably in size.

On January 12th the mixture was changed to potassium bromide, gr. x; tincture of belladonna, $\mathfrak{m}$ x; inf. gent. comp., $\mathfrak{z}$j t. d.; and the thymus was continued as before. During the next two months the patient was troubled a good deal with looseness of the bowels. She lost exactly fourteen pounds in weight between her first attendance and March 2d. On this date her pulse was 126; the thyroid enlargement was noted as only slight and the proptosis moderate. She now ceased attending.

On her return six months later, October 5, 1895, she considered herself now quite well. She was able for ordinary household duties. She had nearly regained her former weight, the proptosis and the thyroid enlargement were scarcely noticeable, but the pulse-rate was still too quick, being 104.

I have seen her several times since, when she has brought a sister to consult me, and she has appeared to have continued in good health and considers herself quite cured.

CASE XXX.—G. W., aged thirty-nine years, railway inspector, first attended February 29, 1896, presenting all the usual symptoms of Graves's disease. Duration of symptoms seventeen years. Twenty years ago he noticed swelling of the neck, which gradually increased. He first wore fourteen and one-half inch collars, then fifteen, now sixteen and one-half inch. At times, with improvement in his health, he has noticed diminution in the size of the swelling. He began to suffer from palpitation of the heart in 1879, which has continued more or less

ever since. His eyes, which were always somewhat prominent, have been decidedly more so during the last seven or eight years. He has had tremors of the hands and feet throughout life, but these became especially noticeable in 1883. Any excitement aggravates both the tremor and the palpitation.

Previous to the onset of illness he was fireman on an engine for three years, during twelve months of which time he had great cause for anxiety, as the driver was passionate and intemperate. His illness had never incapacitated him for work, and he had had no treatment. He has been married seventeen years, and has three healthy children. One of his sisters is mentally affected.

He now complains of cough, which he has had all through the last winter, as well as for several previous winters in succession. At irregular intervals paroxysms of coughing occur, and continue until retching is induced, whereupon the paroxysm ceases and the cough disappears for several hours. These attacks exhaust him very much. He suffers from them at intervals of a month or so.

During the last twelve years he thinks he has lost weight very much. Twelve years ago he weighed 135 pounds; last summer 127 pounds; now 118 pounds.

He was a dark-complexioned man with bronzed face and neck, markedly protruding eyes, and sunken cheeks. Exophthalmos distinct, but not extreme. Von Graefe's sign was well marked; the thyroid gland was considerably and evenly enlarged; neck-circumference at level of cricoid fourteen and one-half inches; marked throbbing of the carotids; heart-action rapid, 120; area of cardiac dulness increased to the left, extending one and one-half inches external to the nipple in the sixth space; no extension to the right of the sternum; no bruits; pulse 120, feeble; lungs normal; no enlargement of liver or spleen; urine 1030, acid; no albumin or sugar; no swelling of legs.

Treatment. For the first seven weeks he was ordered sodium phosphate, gr. xv t. d., with tincture of belladonna, ♏v, for the first fortnight. He was seen once a fortnight, and said he felt better each time.

On April 18th his pulse, as before, was 120; the circumference of his neck had increased half an inch; his weight was 124 pounds. I then ordered him, in addition to the sodium phosphate, to take two drachms of extract of thymus (1 in 1) every night.

Four weeks later I saw him again; he said he was feeling better generally. His pulse-rate and weight remained exactly as on the last occasion. The circumference of the neck had diminished to fourteen and one-half inches. Urine normal. He was ordered to continue with the medicine as before. On June 10th he was *in statu quo*: pulse-rate, neck-circumference, and weight as before. Two months' further treatment and observation showed no material change in his condition.

CASE XXXI.—Female, aged thirty-three years. This patient attended under me for six months in 1891. At that time moderate exophthalmos, moderate goitre, pulse 140, throbbing carotids, palpitation, pigmentation, tremors, nervous irritability. She improved under ordinary treatment. On April 17, 1896, she returned, saying her heart was troubling her very much. There was considerable enlargement of the thyroid, chiefly of the isthmus; pulse 100; no distinct exophthalmos. Treatment, 90 grains of thymus-tabloids a day.

May 1st, pulse 90, thyroid as before. May 15th, pulse 98, thyroid

decidedly larger.   May 29th, pulse 90, thyroid still larger.   Heart still troubling her.   The patient ceased attending after this visit, having, as I think, derived no benefit from the thymus treatment.

CASE XXXII.—Female, aged twenty-six years.   Duration of disease five years.   Moderate and uniformly enlarged thyroid ; circumference of neck twelve and one-quarter inches ; moderate exophthalmos ; pulse 120 ; condition of nutrition fairly good.   At the commencement of the disease exophthalmos and goitre much more marked than now.

Treatment.   No treatment had been tried for two or three years. Patient was able to work as governess, but was anxious for something to relieve her nervousness.   August, 1895, I ordered her tabloid thymus, tabloid thyroid, āā gr. v b. d., which she took off and on for about a year.   She stopped them twice, on account of palpitation, and once could not get them for a month.   I saw her again in July, 1896.   The eyes and thyroid were as before.   Her pulse was 68, but irregular ; and, on examining the heart, I found it beating at the rate of 110.   Her general condition was certainly not improved.

CASE XXXIII.—A. J., female, single, aged twenty-one years, consulted me August 17, 1895.   All signs and symptoms of Graves's disease well marked.   Her eyes became prominent about two and one-half years ago ; the neck became swollen two years ago ; and she became short of breath three years ago.   There was no history of any exciting or predisposing cause, except the occurrence of a slight gas-explosion in the house where she was living, shortly before she became ill.   Among the symptoms from which she suffered were irritability of temper, extreme restlessness, intolerance of heat, disturbed sleep, perspirations, giving of the knees, weakness of the legs especially felt on going up stairs or getting into a carriage, attacks of palpitation and trembling, cramps in the fingers and toes, attacks of diarrhœa, thinning of hair both on scalp and eyebrows, and change of its color to a lighter hue. Lately she had had a troublesome cough coming on in paroxysms.   She was always abnormally thirsty and hungry.   She was well nourished and weighed 136 pounds, her height being about five feet.   A year ago she had wasted almost to a skeleton, but had more than made up for what she had lost.   The degree of exophthalmos was very considerable, the sclerotic showing both above and below, between the cornea and the eyelids.   This was so much the case that people would call out after her in the street.   There was also considerable enlargement of the thyroid, equal on both sides.   The isthmus was broad.   The circumference of the neck was fourteen and five-eighths inches ; at one time it reached fifteen inches.   She observed that the neck sometimes increased in size with exertion.   Her pulse-rate was 102.   There was marked throbbing of the carotids.   A systolic bruit was audible in the pulmonary region.   She was slightly anæmic.   There was no pigmentation of the skin, but she had noticed that last year her skin had a muddy, grayish color.

A remarkable feature of her case was hypertrophy of the legs.   The circumference of the calves was fifteen and one-half inches, and above the knee she measured seventeen and one-half and eighteen and one-half inches. She stated they were much larger than they were formerly. She had to get the largest-sized stockings, and " take in " the feet. There was no pitting œdema.   The catamenia were regular.

Treatment.   I ordered her to take a 5-grain tabloid of thyroid and

one of thymus, night and morning. She remained under the care and observation of Mr. South, of Boston, Lincolnshire, who had sent her to me. She continued to take the tabloids for a year. I saw her again August 8, 1896. She was feeling very much better; the improvement, as will be seen, appeared to be chiefly subjective. During the first six months the neck went down nearly two inches, its circumference diminishing to thirteen inches. It, however, increased again after that, and now measured thirteen and three-quarters inches. She said she had not been troubled much about the neck, on account of feeling so much better. The thyroid remained considerably enlarged, although not so much so as before. In the first six months her weight went down nine pounds, but in the second she gained five and one-half pounds. Her eyes were certainly not so staring, and less sclerotic was visible. Her pulse was 133, but palpitation had come on just as she got out of her cab to ring my bell. On the whole, however, she was not nearly so much troubled with her heart as formerly. She was less irritable, better able to bear heat, and had no unnatural hunger or thirst. Her legs were much stronger, and her knees did not give way. The enlargement still continued as before, and the measurements were the same. The most troublesome symptom had been the paroxysmal cough.

CASE XXXIV.—Female, aged twenty years, single, first came under treatment November 6, 1895. She had then marked exophthalmos, very rapid cardiac action, pulse 146, moderate enlargement of the thyroid. She said she had no strength or energy. Nutrition good. The thyroidal swelling and the other symptoms had only been present fourteen days. No history of shock or worry. No previous illnesses.

For fourteen days she took an alkaline tonic, without alteration in her symptoms. November 20th, pulse 138; weight 115½ pounds; urine normal. Ordered extract of thymus (1 in 4), ʒj; extract of thyroid (3 in 2), gr. j t. d. November 27th, pulse 132. Ordered double the amount of thymus. December 11th, pulse 142; weight 124½ pounds. December 18th, condition the same; pulse 128; thymus and thyroid discontinued. Ordered tincture of belladonna, ♏x; potassium bromide, gr. x t. d. January 1st, weight 137 pounds; pulse 124. January 15th, weight 120½ pounds; pulse 152; weaker and more nervous. Ordered extract of thymus, ʒij t. d., in addition to mixture. January 29th, general condition better; good deal of pigmentation about the face; pulse 136; weight 121 pounds.

CASE XXXV.—Female, aged thirty-one years, single, housemaid, came under treatment November 9, 1895. Died January 19, 1896. When I first saw her all the usual signs of the disease were very well marked. She stated that she first commenced to suffer about five years previously. In the winter of 1890 a walnut-sized swelling appeared on the right side of the neck, in the situation of the thyroid gland. This soon increased in size, and the other side also became swollen. The swelling did not remain uniform, but sometimes was larger than at others. In August, 1895, the swelling was said to have quite disappeared on both sides. For about three weeks it remained quite away, and then suddenly grew again, larger than before. The eyes became gradually prominent, but this was not noticed until about two years after the appearance of the goitre. She had suffered from attacks of palpitation, ushered in by cramps in the hands. Everything has seemed a trouble to her. She has suffered from headache at the top of the

head and across the eyes.   She stated she had been very bad in the
summer of 1895, and had lost flesh very greatly, but between then and
November she considerably improved.

When I saw her in November the goitre was of a considerable size,
the right lobe being about the size of a Tangerine orange, and the left
being about half that size.   The exophthalmos was pronounced, but not
extreme ; the pulse was 128, and the tremors were very marked.   Her
weight was 116 pounds.   She was ordered liquid extract of thymus, ʒj ;
liquid extract of thyroid, ♏ v t. d.   This was equivalent to 45 grains of
thymus and 15 grains of thyroid in twenty-four hours.   On November
16th the pulse-rate was 140 ; on the 23d it was noted that the thyroidal
swelling had become much larger.   On this date the thyroid mixture
was discontinued, and extract of belladonna, gr. ¼ t. d., was given instead.
On November 30th it was noted that the patient was very tremulous and
had difficulty in breathing, while the thyroid was larger.   The pulse was
154.   The weight had fallen to 111 pounds.   The patient was ordered
liquid extract of thymus, ʒj t. d., in addition to the belladonna.   She
took this for a week and then discontinued coming for a time.   On Jan-
uary 4th she attended again ; her pulse was 142 ; she was very trem-
ulous ; her weight had now fallen to 89 pounds.   She looked thin and
ill, and I arranged that she should be admitted to the hospital without
delay.   She did not consider herself to be very ill, and a week elapsed
before she entered the ward.   All the symptoms were well marked, the
degree of emaciation being the most noteworthy feature.   The pulse-
rate varied between 148 and 160.   The thymus extract was continued
for a few days, but was stopped, as the patient suffered from nausea.   On
January 16th she complained of pains all over her, and of a feeling as
if she were going to be strangled.   Her temperature rose slightly, and
she had complete anorexia.

On the 19th she died.   I made an autopsy next day.   The body was
extremely emaciated.   There was generally darkening of the skin,
especially marked on the face, abdomen, and legs.   The thyroid gland was
uniformly enlarged, each lobe being about the size of a hen's egg.   The
vessels on the surface were numerous and highly injected.   The thymus
was persistent, and was spread out over the upper part of the peri-
cardium, forming a layer about one-quarter of an inch thick.   A histo-
logical examination of the thymus was made by Mr. Walter Edmunds,
F.R.C.S., who found it structurally identical with ordinary thymus
tissue, containing the usual lymphoid cells and corpuscles of Hassall.
There appeared to be no doubt that it was functionally active during
life.

SUMMARY AND CONCLUSIONS.   Of the twenty cases I have now
recorded under my care, treated by the thymus gland, one died, and in
six no improvement was observed.   In thirteen cases there was some
improvement.   In none of these, however, have I observed any such de-
cided effect produced on the most important symptoms, and on the pro-
gress of the disease, as could lead me justifiably to conclude that the
thymus had any great therapeutic activity.   For the sake of comparison,
I propose to contrast the progress of these twenty cases with a similar
number treated by other methods.

In the beginning of this paper I stated that the symptom which, up to the present time, I have found most intractable is the rapidity of the pulse-rate. One must, of course, avoid the error of taking the diminished frequency resulting from rest as a result of a remedy. In my cases I have endeavored to avoid this fallacy. In twelve of the cases no alteration in the pulse-rate was observed, and in two it increased slightly. In six it diminished ; in all but one of these the diminution was only slight. In the one case in which there was very considerable slowing this improvement was only observed after the remedy had been taken for some months, and it seems doubtful whether the thymus had anything to do with the change, as the pulse-rate subsequently increased again while the remedy was still continued in large doses. Of the twenty comparison-cases no alteration in the pulse-rate was observed in eleven, and in two it increased slightly. In four cases there was marked but gradual diminution, and in three there was slight lessening of the frequency. It would therefore appear that, as regards the effect on the heart, there is nothing in favor of the thymus treatment.

As regards the thyroid gland, in only three cases was there a material diminution in size. In two cases the goitre actually increased in size while fairly large doses of thymus were being given, and in another it increased after first diminishing.

Of the contrast-cases, the goitre more or less diminished in four, and in a fifth the enlargement entirely disappeared. An increase in size was noted in only one case. In thirteen no change was observed.

It therefore appears that the progress of the enlargement of the thyroid has been much the same whether thymus was given or not.

The exophthalmos decidedly diminished in only one case, and in that it had commenced to lessen before the thymus treatment was started. In the contrast-series three lost their exophthalmos.

As regards the general bodily condition, in eight of the cases the weight was not recorded. In three there was no change. In four there was loss of weight. In three of these this amounted to only a few pounds ; but in one of the three, the fatal case, there was considerable further loss of weight after the remedy was discontinued. In the fourth case the patient lost fourteen pounds in weight, but the loss was quickly made up for when the medicine was stopped. In a fifth case the patient lost weight to the amount of eleven pounds during the first two months of the treatment, but gained twenty pounds during the next two months. In four cases there was a marked gain in weight of from four to fifteen pounds. Of the comparison-series, I find loss of weight noted in only one and a marked gain noted in three cases, amounting to sixteen pounds in one case and thirty-five pounds in another. This, again, is somewhat in favor of the series treated without thymus, but I do not look upon the difference as at all significant.

The dose of thymus given varied from several ounces to ten or fifteen grains a day. The cases which had large doses did not appear to do any better than those treated with small doses.

At the same time it is quite evident, from the record of several of the cases, that the patients themselves were satisfied that the remedy benefited them. When it was discontinued they asked to be put back on it. In no case did it produce any unfavorable symptoms.

The combination of thymus and thyroid was employed in four cases —XXXII., XXXIII., XXXIV., and XXXV.—and in two of these it did not appear to be very well borne.

The last case, which was the fatal one, had no treatment for some weeks preceding her last illness.

The size of the thyroid enlargement appeared to make no difference on the progress of the case. About the same proportion of the cases, with little or no enlargement, did well as of those where there was a large goitre.

It will be observed that I prescribed other remedies along with the thymus in several of the cases, such as belladonna, bromide of potassium, sodium phosphate, etc. This would diminish the value of my observations, if I were endeavoring to maintain that the thymus gland had any specific value; but, as my thesis is that it has no specific influence, the administration of other remedies is not of material importance.

An important point which should be borne in mind is that the most remarkable of the cases of recorded benefit have been those in which the lamb's thymus has been employed. Möbius and Taty and Guérin, who failed to observe benefit, expressly mention that they employed the calf's thymus. I am not able to give exact particulars as to which form has been employed in all of my cases. The tabloids used were supplied by Messrs. Burroughs, Wellcome & Co., who informed me they were made from the thymus of very young calves. The extract of thymus was prepared for me by Mr. White, the pharmacist to St. Thomas's Hospital. It was prepared from lamb's thymus whenever it was procurable, and at other times from calf's. The calf's thymus was used in Cases XV. and XVII., in which large doses were used.

It seems unlikely that any important therapeutic effect should exist in the lamb's thymus and not in the calf's; the reported success of cases treated with tabloids of calf's thymus may be set against the failures.

The conclusion at which I have arrived is that the thymus gland possesses no specific action in Graves's disease. I have found it in most cases to have no effect either on the heart, on the goitre, or on the exophthalmos. At the same time it appears to be a remedy of some value, improving the general condition, and, in this way, may assist toward the recovery of the patient. I should, at present, place it in the same class of remedies as cod-liver oil.

I am of opinion that the dose, to be of any use, should be at least one or two drachms a day, of the fresh gland or its equivalent, in the form of extract or powder.

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TYPICAL EXCISION *VERSUS* INVERSION OF THE VERMIFORM APPENDIX.

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THE not infrequent occurrence of gangrenous inflammation of the appendix vermiformis, and the fact that, in a certain proportion of cases, the gangrene extends to the cæcal wall, make it very desirable to get rid of the entire appendix, whenever possible, in operative attacks upon the organ. Any method which leaves behind appendical tissue thus becomes the seat of inflammation, whether this be an inversion of the stump of the organ after amputation of its distal two-thirds (Dawbarn),[1] or inversion of the entire appendix (Edebohls), is faulty in technique exactly in proportion to the amount of appendical tissue thus allowed to remain. The last-named procedure is particularly unphilosophical. Its originator announces that he does not know what becomes of the inverted appendix, nor does he care.[2] I have ceased to trust an organ with such an especially strong predisposition to destructive inflammation as the one in question, tucked away in the intestinal canal with

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[1] Medical Record, 1895, vol. xlviii. p. 291.

[2] THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, 1895, vol. cix. p. 650.

so complete an interference with its circulatory apparatus as to lead with almost positive certainty to subsequent and perhaps spreading gangrene of tissues. Its blood-supply is almost absolutely cut off by its severance from the meso-appendix, a condition which is found to obtain in cases of partial or complete gangrene of the organ in certain cases of appendicitis. In the latter an endarteritis obliterans of the branches of the appendicular artery, which pass from the margin of the meso-appendix across the latter structure to supply the appendix, is invariably found when sought for (Van Cott). Finally, strictures of the lumen of the organ, either congenital or acquired, are sometimes present and form an insuperable bar to the carrying out of the method. Further, in Edebohls's method there is absolutely no barrier to the spread of infection from the rotting appendix within the cavity of the bowel to the portion of the cæcal wall to which it still remains attached, from which point it is but a step further to the production of general septic peritonitis.

Under circumstances of opening the abdomen for prolonged operative procedures in cases in which it is very desirable to save every minute of time possible, there is great temptation to adopt a method which is certainly seductive in that it offers a most rapid as well as ready means of disposing of the appendix, with the end in view of preventing this organ from giving rise to troublesome disturbances in the future. It was with this object that I was recently induced to adopt the plan so highly recommended by Dr. Edebohls. The unfortunate termination of the case and the findings upon autopsy have completely convinced me that this is a most dangerous plan, and the error committed in following the recommendation of its originator would be but little short of a crime were I not to utilize the experience for the benefit of others who, like myself, attracted by the simplicity of the method and the ease and rapidity with which it may be carried out, may be induced to make trial of it.

The case was that of a patient who was referred to my service at the Brooklyn Hospital for operation for a right-sided pyosalpinx by Dr. Francis H. Stuart. The tube was found only moderately involved, and was easily isolated and removed. The left ovary was found to be about three times its normal size and studded with cysts of varying size; a double oöphorectomy and salpingectomy were therefore done. The appendix vermiformis was located in the S.E. position (downward and inward), and was freely movable in the abdominal cavity. As the element of time was important in this case, its inversion after the method of Edebohls was resorted to and accomplished with extreme ease. The patient rallied from the operation completely, and all went well with her for forty-eight hours, when indubitable symptoms of septic peritonitis developed, of which she died between the third and fourth days. The autopsy, conducted by Prof. Van Cott, the pathologist to the hospital, revealed a septic peritonitis having its starting-point at

the cæcum, which was gangrenous at the site of the inverted appendix. This portion of the large intestine was removed and its interior examined. The appendix, hanging freely in the cavity of the bowel, was gangrenous in almost its entirety, and several gangrenous patches, some of which were as large as a silver five-cent piece, existed upon the cæcal wall.

The device of Dr. Dawbarn, that of inverting the stump of an amputated appendix after throwing a loose purse-string suture about its base, is ingenious and easily executed in a certain proportion of cases. The open end of the organ gives access to the interior and affords opportunity for attempts at dilatation should stricture be present. That attempts to invert the organ do not always prove successful, however, I have learned from experience.

In the case of a young female from whom I removed the appendix at St. Mary's Hospital, Dawbarn's method of disposing of the stump was attempted. There seemed to be no difficulty in accomplishing the inversion. There was observed to be a communication between the lumen of the appendix and the cavity of the cæcum, as announced by the free escape of gas when the amputation was made. The patient died on the tenth day following the operation from a pulmonary condition entirely unconnected with the operation. The parts were examined after death by my assistant, Dr. Walter C. Wood, and found to be absolutely perfect so far as external appearances went. It was only after prolonged search that even at this early stage the site of the appendicectomy could be identified with the cæcum *in situ*. This portion of the large intestine was removed and a further examination made. A longitudinal section of the bowel revealed the highly interesting fact that the inversion had taken place outside the cavity of the cæcum. The appendix was turned inside out, to be sure, but this had taken place between the mucous membrane and the muscular and serous coats of the bowel. The former had been pushed toward the lumen of the bowel, the submucosa being put upon the stretch to permit of this, and the inverted stump lay in the space thus formed.

In the second case in my service at the Methodist Episcopal Hospital a stricture at the appendiculo-cæcal orifice balked every effort to accomplish the inversion, although the stump could be made to disappear completely from sight. Even palpation with the thumb and finger does not always give positive information upon this point, I am assured. It is only fair to say that I had employed Dr. Dawbarn's method a number of times before, and had quite adopted it as a routine measure in suitable cases, before the discovery of this possible fault in its technique.

The possibility of the existence of a sufficiently large vessel in the wall of the appendix from which hemorrhage might take place suggested itself to me early in my use of Dawbarn's method, and this was verified by an experience later on in a case at the Methodist Episcopal Hospital, as follows :

A patient was admitted with well-marked symptoms of appendicitis. It was found upon opening the abdomen that the wall of the organ at its base was comparatively healthy, and that inversion of the stump after amputation could be apparently accomplished with ease.   Upon the following day the patient passed about four ounces of dark fluid-blood, following a movement of the bowels, as well as several large clots.   This was repeated upon three different occasions in the course of the day, and told markedly upon the patient's general condition.   It finally yielded to the administration of full doses of opium.   A careful examination of the lower bowel failed to identify this as the source of the hemorrhage, and it is only fair to assume that it had its origin in the inverted portion of the appendix.

Upon the basis of these experiences I have made further efforts to develop an ideal method of disposing of the appendix in a manner that shall combine safety with, as far as possible, the expeditiousness of the unphilosophical method of Dr. Edebohls and the brilliant device of Dr. Dawbarn.
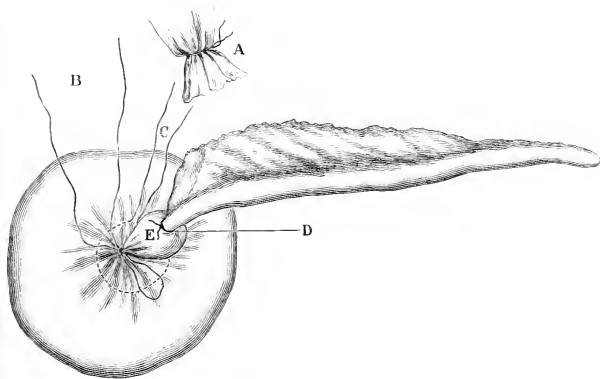
A. Stump of meso-appendix. *B.* Temporary ligature upon cæcal wall. *C.* Purse-string suture. *D.* Permanent ligature at base of appendix. *E.* Bulging portion of cæcal wall where section is made with the thermo-cautery.

Starting out with the proposition that total excision of the appendix should be carried out whenever practicable, and that this should include, in addition to the removal of every possible portion of the organ, measures to prevent infection of the surroundings from contact with the contents of the interior of the cæcum and the lumen of the appendix itself, as well as provision against hemorrhage from the point of section and accurate closure of the opening in the wall of the cæcum, I have

perfected the following method. The appendix is exposed in the usual manner. The further steps of the procedure are as follows:

1. A ligature is passed through the meso-appendix and tied tightly about the base of the mesentery. The latter is then cut across and the appendix freed.

2. The appendix is grasped and drawn forward so as to put it upon the stretch. In doing this the cæcal wall surrounding its base bulges forward. A purse-string suture of silk is passed in the cæcal wall, after the manner of Dr. Dawbarn. This suture is placed upon the cæcal wall from a quarter to three-eighths of an inch from the extreme circumference of the base of the diverticulum or bulging portion of the cæcal wall, in order to insure that no portion of the appendix shall escape the subsequent excision. When the purse-string suture is completed its two free ends are given in charge of an assistant.

3. A temporary ligature is now thrown about the base of the portion which thus bulges forward and either twisted or tied in a "soft knot" (i. e., the second half or bow-portion of an ordinary single bowknot, the first half of the same being omitted). If twisted, the ligature is prevented from untwisting by being grasped with forceps.

4. A permanent ligature is made to encircle the appendix about a half-inch away from the temporary ligature just described.

5. The appendix is amputated between the ligatures and close to the cæcal wall by means of the thermo-cautery, and the stump, which is really a portion of the bulging cæcal wall, touched with the cautery to arrest any possible hemorrhage. The use of the thermo-cautery also serves to sterilize thoroughly any portion of the contents of the cæcum or appendix which may be included between the two ligatures.

6. The purse-string suture is tightened, thus drawing in close apposition the serous surfaces about the cut edges of the cæcal wall, and effectually closing the opening which represents the site from which the appendix has been excised. The provisional ligature is removed by pulling upon one of its ends, the "soft knot" untying and coming away easily, or untwisted, if this method has been employed in securing it.

The entire procedure, as described, occupies but a few moments, and in point of safety possesses advantages that cannot be claimed for either of the methods which it is designed to replace.

When I recall instances in which I have spent considerable time in fruitless efforts to invert the stump of the appendix by Dawbarn's method in cases in which the thick and stiffened wall of the organ, or the existence of narrowing at the appendiculo-cæcal orifice, or both, made difficult ready inversion, and, not infrequently, prevented it altogether, I am convinced that the average time required in carrying out total excision is but slightly, if at all, longer than that of amputation and inversion of the stump.

Where the thermo-cautery is not at hand the excision may be made with the scissors, after careful isolation of the parts, and the exposed mucous membrane cleansed and disinfected by other means. While the risks of hemorrhage from the cut surface in total excision are not great when the section is made with the scissors or knife, yet the possibility of such an occurrence should not be lost sight of. The removal of, or omission of, the temporary ligature altogether would reveal the presence of bleeding; yet, as this would risk contamination of the surroundings following the escape of fecal matter from the cæcum, I have deemed it best to insist, whenever possible, that the section be made with the thermo-cautery, and that the ligature be permitted to remain *in situ* until the purse-string suture is tightened.

HYSTERICAL MONOCULAR AMBLYOPIA COEXISTING WITH NORMAL BINOCULAR VISION.

WITH REPORTS OF TWO CASES.

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UNTIL recent years it was assumed that the anæsthesiæ of hysteria differed in their outward manifestations in no way from the anæsthesiæ due to organic disease. It is now well known that there is a great difference in the behavior of these defects, according as to whether they are of organic or of functional origin. For instance, among the essential peculiarities of hysterical cutaneous anæsthesia may be mentioned the tendency to variability in its distribution, its boundaries enlarging and contracting, sometimes from day to day, and its intensity deepening and lightening. The possibility of transfer from one side of the body to the other in exceptional subjects is also noteworthy. The variations in the extent of the visual field is a phenomenon analogous to what occurs in the areas of common sensation.

More remarkable is the fact, which has been shown to be true of at least one class of hysterics (whether it is true of all remains to be proved), that in one sense of the word this anæsthesia is no anæsthesia at all. The hysteric really feels and hears and sees. The sensory impulses coming from the periphery are not only physiologically recorded, but are perceived by the subject and associated with other mental processes. The real defect is a psychical one—namely, the sensory images do not enter into that chain of associated ideas which constitutes the individual's personality. This fact has been confirmed by numerous observers.

Some time since I had an opportunity to demonstrate this sensory peculiarity in a patient of mine. The results obtained were in entire harmony with those recorded by Binet, Janet, and others, in France. A knowledge of their peculiarities renders more intelligible, perhaps, though they may continue difficult of complete explanation, some of the still more recent observations on the behavior of hysterical amblyopia. These observations are illustrated by the cases I am about to report, which thus may be taken as further confirmation of what has been previously observed.

It has been assumed hitherto that the tests for organic amblyopia are applicable to hysterical amblyopia. This would seem in the light of these recent experiments not to be the case, and a persistence in their use is liable to lead to grave error.

The first of the cases which were the objects of the following observations was one of hysteria in a male presenting the usual phenomena of hemianæsthesia and hemiplegia. In the grouping of the symptoms, which were classical, it was a typical case. One point worth remarking, however, was the purely psychical character of the cause, which was a mental shock or fright of what would seem to be moderate severity :

The patient was sitting in an electric street-car which was in imminent peril of colliding with the car ahead of it. The impetus of the car was so far stopped that the collision was trivial. That, however, danger was apprehended was shown by the fact that one passenger, seeing the probability of collision, jumped off the car to avoid the shock.

The patient was thrown forward partially out of his seat, so that he struck the side of the car. I should judge that this was due to the sudden checking of the impetus of the car by the brakes rather than to the collision.

I am indebted to Dr. F. G. West for the opportunity to examine the case. Dr. Edward Lane, superintendent of the Boston Lunatic Hospital, was also present at and took part in the examination. The examination, eighteen months after the accident, revealed besides the visual symptoms the following conditions : left hemiplegia (face not involved). The grasp of the left hand very feeble when eyes are open and fixed on the movements of the hand ; when eyes are closed grasp of hand becomes almost *nil*. Rises from bed with great difficulty ; can walk with help. Tongue protruded straight. Left hemiæsthesia and hemianalgesia, involving face. No atrophy. Paralyzed limbs not spastic. No ankle-clonus. Knee-jerks equal and normal. Hearing : right ear hears watch at six inches ; left, in contact. Principal subjective symptom was pain in back of the head and down spine, which was tender. Patient very emotional ; cries without sufficient cause ; irritable, and during examination became violently excitable ; seemed to think he was the object of a conspiracy. (It was said that a few days subsequently he had left the house and hid himself in the marshes.) At the time of the accident it is stated by him that there was a momentary loss of consciousness, followed, on coming to himself, by momentary blindness (?). Taken home and put to bed. Symptoms at this time : dull, heavy

burning pain in the back of the head, and pain in the spine ; nausea without vomiting. Confined to bed for fourteen months by pain, paresis, etc.; then gradually improved. Now able to be up about four hours a day. Whole mentality has changed ; formerly a person of good spirits and temper ; now depressed, and as above. That the symptoms were due to hysteria is confirmed by the subsequent history.

The points to which I wish to call attention here were the peculiar characteristics of the amblyopia. The left eye was affected—that of the paralyzed side.

The vision in the right eye was good. I will say here it was not thought desirable to repeat the examination to determine the exact visual acuteness in each eye, owing to the highly excitable and other mental symptoms exhibited by the patient and the exhaustion caused by the examination. I should also have made other tests of scientific value were it not that I did not consider it desirable for the same reasons. I hoped to be able to do so later, but in this I have been disappointed. But it was easily determined that the vision in the left eye was much impaired, and presented the following apparent anomalies :

When fingers were held up before the eye (the right eye being closed) at a distance of say one foot to three feet, he (the patient) could not count them though they were seen in an indistinct way ; but when moved away from him to a distance of about eight feet, he could count them, or rather he saw them multiplied ; *i. e.*, there was *monocular polyopia*.[1] A candle at this same distance was seen ; but not as a distinct flame, but as splashes of light. Ordinary type of a newspaper or book could not be read with the amblyopic eye at any distance. The left eye was also color-blind.

The field of vision of the left eye was retracted to the extent that at the distance of eight feet it had a diameter of from two to three feet.

There was, then, in this case *monocular amblyopia, color-blindness, retraction of the field of vision, polyopia, and a withdrawal of the fixation-point ; or, rather, a retraction of the near-point and an approach of the far-point to a distance of about eight feet.*[2]

To test the genuineness of these phenomena I gave the patient a book to read, and while he was reading aloud I slipped a pencil between the sound eye and the printed page.[3] To my surprise he read the words

[1] An oculist who saw the patient stated that the largest A of Snellen's test-types was not read when held close to the eye, but was read at a distance of eight feet.

[2] There were two peculiarities in connection with the polyopia and withdrawal of the point for clearest vision worth noting. The multiplication of the objects was not always a fixed number, as would presumably be the case in monocular polyopia from physical defects of the visual apparatus (lens). That is, he did not constantly see three, four, or five objects, but stated that he saw a great many and found difficulty in counting them. A physical defect ought always to produce a definite multiplication. Unfortunately this point was not very accurately inquired into, but the patient's statement accepted. (The patient was very irritable and excitable, and the examination was conducted with difficulty.) Secondly, the fact that large A, Snellen, could be read at eight feet, but not at say one foot, cannot be explained on principles of optics. To read this at eight feet requires an accommodation of only one-half dioptric ; that is, parallel rays must be converged by a lens of that amount ; this type should be read at one foot. The explanation of these two phenomena must therefore be psychical and not physical.

[3] The principle of this test is as follows : in binocular vision, both eyes being normal, a pencil or a similar object held in the line of vision of one eye before a printed page does not obscure any part of the field because the letters obscured from one eye are seen by the other ; but if one eye be blind, the pencil interposed in the line of vision of the sound eye must

without interruption. If hysterical blindness follows the same laws as organic blindness, this test would indicate malingering. If he could not see with his alleged amblyopic eye, any sufficiently large object placed before the good eye must necessarily obscure some of the printed words.

Before forming a decisive opinion, it was thought advisable by Dr. Lane, Dr. West, and myself to make further tests. I therefore procured a very strongly convex lens, through which it was impossible for an ordinary eye to discern objects. Giving the patient again a book to read, I slipped the lens in front of the good eye while he was reading. If the alleged blind eye was really blind, he should not be able to read under these conditions; but if this eye was not blind, and supposing he was unprepared for the test, as I have every reason to believe he was, he should have read without difficulty. As a matter of fact, he stopped reading at once, and found fault with me for preventing his seeing.

The following test was then resorted to: a lighted candle was held about eight feet from the patient. At this distance the amblyopic eye alone could not recognize the candle-flame as a distinct flame, but saw it only as splashes of light. The other eye saw the flame distinctly. Now while both eyes were open a prism was held over the amblyopic eye. The principle of this test, it will be remembered, is this: if the person has normal vision in both eyes and a prism is held before one of them, any object is seen double—diplopia; but if one eye is blind, only a single object is seen when the prism is held before the good eye.

Now when the prism was held before one of the eyes of this patient both eyes being open, not only were two candles seen, but they were seen as two distinct flames described by the patient as similar to one another. In other words, the patient saw normally with each eye when both eyes were open; but the convex lens test apparently showed that he did not see with the left eye when the good (right) eye was closed or obscured.

What conclusions are we to draw from these apparently anomalous phenomena? Are we to conclude that this patient was shamming, or that hysterical amblyopia follows different laws from that due to organic disease? Before passing upon this question, I should like to call attention to the work which has been done in the elucidation of this subject, the reports of which are, so far as I know, confined to French works.

Parinaud was the first to point out some of the remarkable peculiarities of hysterical amblyopia, which I shall later refer to, but it will be more convenient to speak first of the work of Pitres.

Pitres's first experiment was made upon an "hysteric who," he writes, "for several years had been scarcely able to distinguish light from darkness with the left eye. The test employed was that of the 'boîte de Flees,' designed to detect malingerers. This apparatus, you perhaps

necessarily cover certain letters which consequently cannot be read, as the second eye is blind. The test is useful to detect malingering, but requires care in its use. A malingerer, falsely claiming to be blind in one eye and not knowing the test, reads all letters without hesitation, thinking he does so with his good eye alone.

know, is formed by a box furnished with two oculars and having the external appearance of a stereoscope. At the bottom of this box are placed two points of different colors, one at the right and the other at the left, and by an ingenious arrangement or disposition the subject sees with his right eye the point situated on the left, and *vice versa*. Suppose that a malingerer who has not been warned pretends to see with the right eye; he will say that he does not see the point that appears to him on the right; now it is precisely that point which is perceived by the left eye. But to come back to our hysteric. Hardly had she looked into the instrument than she said without hesitating: 'I see two points, one red and the other blue.' I showed no surprise. However, I observed that the deceit I suspected did not betray itself by the mistake which malingerers usually commit. Some time after that I repeated the experiment of the 'boîte de Flees' upon two other hysterics, equally amblyopic on the left side. The results were the same. These patients, who did not see with the left eye alone, distinguished very clearly the two points at the bottom of the box. I asked myself then if the hysterical amaurosis was not a functional trouble existing only in monocular vision, and, proceeding upon this hypothesis, I made a certain number of experiments, of which the concurring results established my conviction.

" Here is one of the patients who served for these observations. When her left eye is closed she sees very well with the right eye. When, on the contrary, the right eye is closed, she scarcely distinguishes with the left eye light from darkness. The two eyes being open, I ask her to look at a red cross drawn in the centre of a black background. Then I place a prism before the right eye. The patient sees at once two red crosses. Place now the prism before the left eye, and the patient still declares that she sees two red crosses. According to well-known physical principles, this diplopia, induced by the interposition of the prism, can be produced only if the two retinæ are excitable. One of the two is excited, in fact, by the real image, while the other perceives the image deviated by refraction. Under the conditions in which we have just placed her our patient then used both eyes for vision.

" Let us now use the experiment with the screen. I write upon the blackboard a line of letters; a sheet of cardboard is placed vertically before the meridian-line of the face of the patient while she is seated immediately in front of the blackboard. When the right eye is closed she declares she is incapable of distinguishing the characters written upon the board. When the left eye is closed she reads with hesitation the letters written on the right screen. When both eyes are open she reads all the letters, those on the left of the screen as well as those which are on the right."

What has been shown by Pitres to be true of the perception of form has been shown by others to be true of the perception of colors. Parinaud, for example, found that if the left eye is blind for green, which it sees as gray, while the right eye is normal, and a prism is placed before the normal eye, instead of two images, one gray and the other green, being seen, both are green. He adds: " On repeating this experiment, I have observed that if the prism is placed over the abnormal eye, the two images are gray; but it is necessary for this that the ambly-

opia should not be too pronounced." This, if true, is a fact difficult to reconcile with the other phenomena. The same observer further found what may prove to be a fact of considerable practical value, that a certain number of patients who were color-blind in *both* eyes, each tested separately, could *distinguish colors in binocular vision*. Parinaud concluded as a result of his observations in hysterical amblyopia that an eye that does not see in monocular vision can see in binocular vision, although this is not true in all cases. He is disposed to attribute the failure to see to " too high a degree of amblyopia in the *second* eye, or that binocular vision did not exist or existed imperfectly before illness."

The observations of Parinaud have been confirmed by others. Charcot and Regnard made the following experiments :

A patient blind for green could see red ; but if a disk colored partly red and partly green revolved, she saw it not as red, but as gray ;[1] when the disk was still it was seen as red and white. Again, a red and white disk was placed by the side of the first ; the patient saw them alike ; but when the red and white disk was in motion the patient saw it as pale red, while the red and green disk in motion was seen as gray.

Regnard also demonstrated that an hysteric color-blind for red still has a green after-image ; and Charcot observed that certain persons with hemianæsthesia and monocular color-blindness for one color see distinctly that color even with the affected eye in binocular vision. Bernheim also has confirmed Parinaud's results.

It is also stated that the re-establishment of binocular vision in these cases is not true of peripheral vision, but only of central vision, although in many cases of concentric limitation of the visual field the field enlarges $10°-70°$ on opening the second eye. The explanation of these curious phenomena still remains to be found. Parinaud thought they showed that there is a special mechanism for binocular vision, that in monocular vision each eye is in connection with a single hemisphere, that of the opposite side ; in binocular vision, on the contrary, the two eyes are in connection with each hemisphere, which may be indifferently right or left.

Janet, while indorsing this view, would also add a psychological element of the nature of the associated sensations, for he claims that the amblyopic eye of certain subjects can see even in monocular vision, if the visual image occurs simultaneously with a strongly associated sensation of another kind, " just as the image of a caterpillar upon the arm restores the tactile sense of the [anæsthetic] arm. So the images from the sound eye may, by association, bring back into the field of consciousness the images from the amblyopic eye." That this, however, is not a complete explanation will become evident by the fact, as will

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[1] Red and green mixed are normally seen as gray.

be observed in the second case here reported, that normal binocular vision may be present even when both eyes tested singly are amblyopic.

Before returning to the case just described, I will briefly refer to the other ocular symptom present, viz, relatively clear vision for objects at a fixed distance only and polyopia. Parinaud explains the former by a contracture of the muscles of accommodation. By reason of this contracture the near-point and the far-point coincide, and the eye cannot accommodate for objects placed either nearer or further than that determined by the contractures. Thus a concave lens may be necessary for distance and a convex lens for near objects.

Charcot has also insisted upon the occurrence of this form of contracture in hysteria following traumatism. Parinaud claims that this contracture is often overlooked, because it is generally concealed by the amblyopia. That this is not a satisfactory explanation of the phenomenon in question, in our case at least, has already been pointed out (see foot-note, page 159). It is more probable that this phenomenon is dependent upon cerebral or psychical disturbances, and has therefore a central origin. The same may be said for reasons already given of the polyopia which quite frequently accompanies hysterical amblyopia. This has been explained by the contracture. It appears only at a certain distance, which corresponds to that fixed by the supposed contracture. Even upon this supposition the exact connection between the two is not clear. It is assumed that it is due to unequal refraction of all the segments making up the lens, and in consequence of which the image from each segment is not focussed on the same spot on the retina. Parinaud assumes, without proof, as it seems to me, that this unequal refraction is caused by the contracture of the muscle of accommodation. A central origin seems to me more likely, at least when the polyopia is a multiplication of images of an inconstant number.

Since the above notes were presented to the Boston Medico-Psychological Society I have had the opportunity to observe another case of hysterical amblyopia, which presented the phenomena of improved or normal sight with binocular vision. As this case, however, was the subject of litigation, and as one of the most important points to be determined is the possibility of deception, which has been very strongly intimated in certain quarters, this case will add nothing to what has already been noted above. As I could not absolutely exclude deception, the accuracy of the observations might be questioned. In order that the question of deception might be settled, I have been for a long time in search of a case, the *bona-fide* character of which could be accepted without question. Such a case I now present. It seems to me that the conditions under which the case was observed must carry the same conviction to others as to myself, that malingering can with perfect

safety be excluded. It is desirable that the circumstances under which the case was observed should be related.

The subject was an applicant for a position on the police-force of the city of Boston. To obtain such a position every applicant is required to pass a physical examination under the Civil Service Commissioners of the State. The examinations under the civil service rules are competitive, and involve considerable trouble and some loss of time to the applicants, who frequently give much time to a preparatory training for them. Each applicant is obliged, first, to pass a competitive educational examination, he is then examined physically to determine his soundness, and finally is obliged to compete in a physical examination in gymnastics. Those receiving the highest percentages are recommended for appointments. All this, it will be seen, involves much time and trouble on the part of the applicant, and it is plainly for his interest to pass as good an examination as possible.

It is difficult to conceive of a mentally sound person attempting to pass such an examination and then wilfully and deceitfully pretending to have poor eyesight.

It may be added that the subject presented all the appearances of being honest, and in other respects no suspicion of malingering was attached to him.

On May 9, 1896, the applicant presented himself. When I examined his vision I covered his right eye as usual with a screen, and asked him to read Snellen's test-types with the left eye. He could only read $\frac{15}{100}$. As soon as he did this he turned to me and said that he could not see well with each eye separately, but he could see perfectly if he used both eyes together. He went on to say that two or three years ago he had been rejected on account of imperfect sight by the physician making the examination, who tested each eye separately, and therefore found, as I had, defective vision in each. The patient further stated that when he was informed of his rejection he was surprised, because he always thought he had good sight. He then went to an oculist, who confirmed him in the fact that with binocular vision his sight was normal; it was only with monocular vision that his eyesight was impaired. He argued that inasmuch as he had perfect binocular vision he should be passed. It was plainly evident that it was greatly to the advantage of this patient to make out his eyesight to be as near perfect as possible, while the contrary was to his disadvantage.

After he made this statement, I continued the examination and found that the vision of the right eye alone was $\frac{15}{60}$ minus. Binocular vision was $\frac{20}{15}$, which, taking into consideration the poor light of the room, was better than normal. His visual field, tested with the finger, was apparently normal. I also made out partial color-blindness; according to my recollection, the color not recognized was green, but my notes are defective on this point and it is possible that this observation may have been erroneous (although I do not think so), inasmuch as on the second examination he matched all colors perfectly.

Later the applicant was subjected to three different examinations; on

one occasion in conjunction with Dr. J. J. Putnam and on another occasion by Dr. O. F. Wadsworth, who, as an oculist, kindly examined the case for me and has given me the results of his examination. I am thus fortunately able to add to my own observations those of two independent and competent observers—one of them an oculist. Results of the tests used at these examinations varied somewhat, but I may state here we all agreed *as to the bona-fide character of the phenomena, the existence of amblyopia when one eye was closed, and normal vision when both eyes were open.*

On May 10th, when the subject was examined by Dr. Putnam and myself, he still exhibited the same degree of amblyopia as on the previous day, when one eye was completely covered—that is:

$$\text{V. O. S.} = \tfrac{17}{100}.$$
$$\text{V. O. D.} = \tfrac{17}{70}.$$

When neither eye was covered, vision was $\tfrac{20}{15}$. Now, when the prism was slipped before either eye, contrary to what was expected and to the results obtained in my previous case, the *amblyopia developed at once, and diplopia was not exhibited.* Repeated tests with the prism gave the same results, which were the same irrespective of the direction of the axis of the prism; that is, whether vertical or horizontal, and irrespective of the position of the base, etc. So that it is not probable that the absence of diplopia was due to the patient involuntarily overcoming by muscular effort the effect of refraction. This seemed to show that in this case, although light entered both eyes, the amblyopia was not removed and binocular vision was not really restored. We thought this might be due to auto-suggestion, or some mental inhibition or disturbance of the visual images derived from the two eyes; this disturbance being caused simply by the presence of the glass, which suggested that the eye before which it was held was covered or its vision interfered with. To test this point, and not having a plain glass, a diaphragm was made from a piece of paper in which a hole was cut. Later an ophthalmoscope without a lens was substituted for this. The patient was made to hold the diaphragm before one eye, but to use both eyes for vision. Care was taken to make sure that the patient held the diaphragm with the hole directly in the line of vision. Under these conditions, of course, the binocular vision was not *physically* interfered with at all. Nevertheless, at first the amblyopia was not removed, the patient saying he was unable to see. Later, after the patient learned to use the diaphragm and began to appreciate that there was nothing in the apparatus that would interfere with his vision, he was able to see nearly normally; and at the next examination he reported that he had been practising with such a diaphragm at home and could now see perfectly well.

Dr. Wadsworth, also, reports that he made a similar test as follows: "Two prisms of equal magnitude were placed together so as to counteract one another and make what was equivalent to a plain glass, and then held before one eye. Under these circumstances the amblyopia still persisted, although theoretically, from an *optical point of view,* the patient should have seen as well as when he used both eyes without a glass. This experiment seemed to show that the failure to see under the conditions of the experiment was due to some sort of mental inhibition by auto-suggestion."

On the next day the patient, being examined by myself alone, the

prism-test was again applied and somewhat different results obtained. When the prism was now held before either eye the amblyopia was nearly removed. The exact degree of vision existing under these circumstances was not determined, but the patient was able to read type that he could not read if either eye was blindfolded. But now, although vision was improved by the prism sufficiently to enable him to read type that he could not read with each eye singly; nevertheless there was no double vision, and the patient insisted he saw only one object, and this irrespective of the direction of the axis of the prism, etc. But when the prism was turned around so as to change the direction of the axis and the apparent relative position of the object, the patient stated that the test-object (a piece of white paper with the letters B and A) moved as the prism was turned. This is what happens normally when the prism is similarly manipulated before one eye, the other eye being closed. Up to this time great care had been exercised not to suggest to the patient that he should see double, or that there was any such phenomenon as diplopia.

Now, as I thought that unintentionally he might have neglected one of the images, and might have concentrated his attention upon only one, he was asked whether he could not see two images, and care was taken that he should understand the nature of the test. He still asserted that he could see only one image, and that this image changed its position as the axis of the prism was turned.

(Query : Was the improvement, or the disappearance of the amblyopia on this occasion, due to suggestion from the fact that the patient had been practising at home with a diaphragm and had learned to see normally through it, in consequence of which the idea was suggested to him that the prism-test was of a similar nature ? I should answer this in the affirmative. Again, did the patient really have normal *binocular* vision with the prism, one image being mentally suppressed, or was normal vision restored only to the eye which looked through the prism ? The latter seems most probable, as only one object was seen even when he tried to see two, and this moved as the prism was turned.[1])

The second test was as follows : the patient was given a book to read with binocular vision ; this, of course, he did perfectly. While he was reading a strong convex lens was slipped before one eye. The patient stopped reading at once, and was unable to continue ; that is, amblyopia was developed at once by the obscuration of one eye, and the effect was the same as when one eye was blindfolded.

The third test was that with the screen. When this was used on two different occasions, once by Dr. Putnam and myself, binocular vision was not restored ; that is, the amblyopia continued in each eye.

Dr. Wadsworth, to whom I am indebted for valuable criticisms, reports to me the following interesting results of the pencil-test obtained by him. By this test, after a primary failure, he succeeded in obtaining

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[1] In either case, strictly speaking, there was only monocular vision, but in the first case the second image would be formed but excluded from consciousness ; in the latter it might not be formed at all.

vision in one amblyopic eye under conditions similar to those under which the amblyopia developed ; that is, while central vision was obscured in the other eye.   Instead of a screen, he held a pencil directly in front of some small test-type.   The patient was unable to read all the letters those that were cut off from sight by the pencil not being seen.   That is, only those letters were seen which formed an image in each eye—binocular vision ; when some letters were cut off from one eye the other failed to read them—monocular amblyopia.   By a process of education (or suggestion ?), so to speak, he succeeded in overcoming this ambly-opia and producing a monocular vision.   The pencil was held to one side, where it could still be seen, but where it did not obscure any letters.
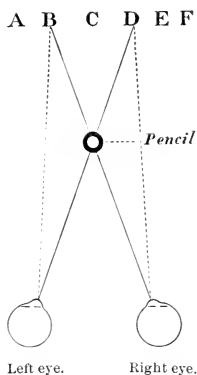
First B obscured to right eye and not seen by left.
Second B obscured to right eye, but seen by left—monocular vision.

After the patient was accustomed to this it was brought in front of the type. The patient now read all the letters, although some were obscured to each eye ; that is, while one eye was obscured for central vision, the other saw and the monocular amblyopia disappeared.   A glance at the diagram will render this clear.   (This test shows the dangers of assum-ing malingering because of contradictory results.)

In this experiment, although central vision was cut off, peripheral vision was not, and images of neighboring letters, A, E, F, were formed upon other parts of the retina. This may have played an important part in restoring vision to the other eye.   Janet, for example, states that under similar conditions an amblyopic eye (the other eye being normal) has seen when the test-letters formed words, the adjoining letters, by association, seeming to have drawn the previously unperceived images of the amblyopic eye into the field of consciousness. So it may be that the peripheral binocular vision in this test may have induced the monocular vision (or was it suggestion ?).

The field of vision tested on several occasions with the finger ap-peared perfectly normal.   Color-perception at the second examination was normal.   The patient complained that his eyes were made tired by

the examination to a degree out of all proportion to what would occur
to a normal person, and that peculiar quivering of the eyelids so fre-
quently observed in hysteria was very noticeable. There was no anæs-
thesia of the face or hands. The surface of the remainder of the body
was not examined.[1] In all other respects the patient was a perfectly
healthy individual, unconscious of any infirmity, who performed manual
labor daily. I was unable to obtain any history that would throw any
light on the origin of his trouble. No blue-line on his gums or other
evidence of lead-poisoning. He had received a slight blow on his head
a few years ago, but this at the time did not cause any noticeable dis-
ability.

It seems to me that this second case settles, if this still be necessary,
the question once and for all of malingering as an explanation of the
apparently paradoxical phenomena observed in hysterical amblyopia.

I may say that Dr. Putnam, Dr. Wadsworth, and myself were agreed
that deception was not to be entertained in the second case just reported.

These cases may be taken as corroborative of what has been observed
by such competent observers as Parinaud, Charcot, Pitres, and others
on the Continent. The fact that the results obtained by each of these
observers have been substantially in harmony is not to be overlooked.

The circumstances under which my first case was observed, it being
one that was involved in litigation for damages, did not preclude the
possibility of simulation ; and the fact that the tests gave results similar
to those obtained in simulated blindness from organic disease naturally
suggested the theory of deception. But, on the other hand, the other
phenomena observed in this case can hardly be reconciled with this
theory. To maintain this view it is necessary to assume that the patient
was conversant with the phenomena of monocular polyopia and the so-
called contracture of the ciliary muscle(?) (a clear vision only for
objects at a fixed distance), phenomena which, as yet, so far as I know,
are not mentioned in English text-books in connection with hysterical
amblyopia.

I am also certain that the physicians who had the case in charge, or
who saw the case with me, were not familiar with these phenomena, and
that therefore the subject could not unconsciously have obtained a hint
from them. It should also be borne in mind that the other somatic
symptoms observed in this case, such as paralysis, anæsthesia, etc., were
typical of hysteria ; and if the peculiar phenomena connected with the
amblyopia had not been observed, one would never have thought of
doubting the *bona-fide* character of the other symptoms.

The fact that hysterical amblyopia follows different laws from those
of organic amblyopia is one of the highest practical importance. And
it is necessary to bear this in mind in applying the ordinary tests for

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[1] Further examination could not be obtained.

simulation. Tests which are applicable to organic amblyopia are useless in the hysterical form, but valuable in distinguishing organic disease from functional disease, but not in determining the actual existence of the latter.

The occurrence of binocular vision in monocular blindness in hysterics, even when there is some impairment of vision in the sound eye, explains the slight disability occasioned to such patients by this ocular defect.

RELATION OF DERMATITIS HERPETIFORMIS TO ERYTHEMA MULTIFORME AND TO PEMPHIGUS.[1]

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CONSIDERING that there has been, and that there still exists, some diversity of opinion among dermatologists regarding dermatitis herpetiformis, especially as to the cutaneous manifestations which should be included under this caption, and those that should be relegated elsewhere, a few remarks concerning the relation of this dermatosis to several well-known diseases may be made, with a view of making the subject plainer. It is not my intention to discuss the literature of the past decade, to criticise the cases that have been recorded as examples of dermatitis herpetiformis, nor to discuss the views of the reporters of such cases, beyond remarking that in some instances gross injustice has been done to this disease. It is not out of place here to state that the writer, in the light of additional clinical experience, sees no reason for changing his views as expressed in his earlier communications. Well-defined, typical cases are from time to time still presenting themselves to him as formerly. Cases with less clearly defined features are also sometimes met with, as well as occasionally cases in which it is difficult in the beginning of the attack to decide whether they should be classified with dermatitis herpetiformis or with some other disease. Such being the case, it is proper to note and label all the typical cases met with. There are enough of these to make the subject interesting and to enable us to say that they represent a special cutaneous disease—a disease *sui generis*. There exists among observers, however, but little difference of opinion concerning typical cases. These have been recognized and described in all dermatological centres, and the reports are so uniformly alike that no time need be spent here in a recapitulation of this subject.

The two diseases that bear the most likeness to dermatitis herpeti-

formis are erythema multiforme and pemphigus. Dermatitis herpeti-
formis possesses clinical features common to both, but it is more closely
related to erythema multiforme than to pemphigus. It also possesses
features in common with herpes, in a sense that the eruption is herpeti-
form and also neuritic. By the term neuritic I mean that the cutaneous
manifestation is obviously under the control of the nerves of the skin,
as in the case of herpes simplex and herpes zoster. With the term
neurotic, on the other hand, I would convey the idea that the disease of
the skin was due to nerve-influence, but that this cause was not neces-
sarily patent on the skin. Thus, alopecia areata and vitiligo are both
neurotic diseases, but they do not display unmistakable signs of the
cutaneous nerves being involved, and hence would not be called neuritic.
Upon the herpetiform character of dermatitis herpetiformis I have always
insisted. This feature is striking in all cases, and is a just reason for
taking exception to the term dermatitis multiformis for this disease, as has
been suggested by some observers. The term multiformis fails to convey
any idea of the chief characteristic of the disease, namely, its herpeti-
formity. The term multiformis is general and vague, and is without
special significance beyond the point that it indicates polymorphism,
a feature common to certain other diseases, notably eczema. Herpeti-
formity, on the other hand, as stated, is eminently characteristic of this
disease. Without it there can exist no dermatitis herpetiformis.

I have stated that dermatitis herpetiformis possesses features in com-
mon with erythema multiforme. Not only are both diseases strikingly
polymorphic in their manifestations, but they are, moreover, allied
in nature. In some cases of dermatitis herpetiformis this observation
is conspicuously manifest. Many cases will be found at one period or
another in their course to possess certain features common to erythema
multiforme. There are instances, however, in which no resemblance to
erythema multiforme occurs at any period in the course of the disease.
It will be understood that erythema multiforme is employed in its broadest
sense, and that it includes herpes iris. In dermatitis herpetiformis the
cutaneous manifestations, it may be remarked, are in most cases more
intense, more persistent, and more chronic than in erythema multiforme.
The formation of pustules, especially miliary and acuminate, moreover,
so common in dermatitis herpetiformis, is a feature that is wanting in
erythema multiforme. In some cases the series of symptoms in der-
matitis herpetiformis are such as to suggest the idea of a chronic ery-
thema multiforme. But, even in these instances, the process will be
found to be considerably more than a chronic erythema multiforme, so
that even if the use of this term were sanctioned, a correct idea of the
process of dermatitis herpetiformis would not be conveyed. While, there-
fore, some cases of dermatitis herpetiformis are allied to erythema multi-
forme, and simulate that disease, it would be unjust to both to regard

them as being one and the same disease. It may be remarked here that, in my experience, dermatitis herpetiformis simulates erytherma multiforme more frequently than *vice versa*. I have seen cases of undoubted dermatitis herpetiformis (as proved by the history and the subsequent course of the disease) resemble in the beginning erythema multiforme, but usually only for a short period. I have also met with rare cases in which a threatened dermatitis herpetiformis proved to be an erythema multiforme. Such experience long ago led me to the conclusion that these diseases were cognate.

The other well-known disease to which dermatitis herpetiformis bullosa is more distantly related, and to which it bears a likeness, is pemphigus, but from which it differs in important particulars. In dermatitis herpetiformis blebs occur in certain varieties. They appear especially in the bullous and in the multiform varieties. In pemphigus, it need not be said, they are constant lesions. The existence of blebs in dermatitis herpetiformis does not in itself signify a relationship to pemphigus any more than the blebs in herpes iris indicate a kinship to pemphigus. No one, I believe, at the present date holds the view that herpes iris and pemphigus are closely related; nor does anyone contend that pemphigus and herpes simplex or herpes zoster are akin. In this connection I may refer to the subject of the coexistence and the combination of morbid processes, giving rise to deviations in type and to modifications, which I believe is a much commoner occurrence than is generally considered to be the case. By admitting that morbid processes in general may coexist or combine, the numerous variations from types of diseases so constantly met with may be accounted for. Some so-called "anomalous cases" may thus be explained. The point of practical importance in all such instances is to determine the prevailing morbid process, to distinguish between essentials and accidentals, in order that therapeusis may be directed against the predominant process. I believe that dermatitis herpetiformis may in rare instances occur in combination with certain other diseases, particularly with erythema multiforme and with pemphigus; and also that it may merge or lapse into these diseases. Clinical experience seems to warrant this statement, and I can see no objection to accepting this belief. Cases of dermatitis herpetiformis sometimes occur that partake more or less distinctly of erythema multiforme, others of pemphigus; that is to say, they possess clinical features that are strongly suggestive of one or the other of these diseases, yet holding fast to the peculiar features of the type. It may be said that dermatitis herpetiformis occupies a position between erythema multiforme and pemphigus.

It will be borne in mind that dermatitis herpetiformis possesses the peculiarity of manifesting itself with varied primary lesions, and of pursuing an irregular course. Irregularity or even capriciousness in

the production of the lesions is in most cases a notable feature. They may be erythematous, papular, vesicular, pustular, bullous, or a mixture, and sometimes they all occur together. Polymorphism is usually a prominent feature, generally more so even than in eczema. On account of this peculiarity a general likeness to eczema is occasionally met with. I recall one of my earlier cases, that was under observation for a long period, the lesions being small herpetiform vesicles and pustules, occurring in patches, accompanied by intense itching, and was for a long time regarded as a multiform eczema of an unusual type. Throughout a period of several years it certainly bore more resemblance to eczema than to any other established disease of the skin. At no time was there any likeness to erythema multiforme (erythematous, vesicular, or bullous), nor to pemphigus. In dermatitis herpetiformis polymorphism is even more notable than in erythema multiforme. It is not, however, a constant feature. Occasionally cases are met with in which it does not occur, the lesions being, it may be, vesicular, pustular, or bullous throughout the attack. It is especially in relapses and recurrences that this feature is most conspicuous. In this respect the disease is altogether different from pemphigus. The evolution of the lesions, moreover, is irregular, and is peculiar. In probably no other disease is this so singular. One notable feature is that they incline to make abrupt and radical changes, as, for example, a vesicle into a pustule or bleb; and, furthermore, that vesicle, pustule, and blebs at times may appear simultaneously, and often are seated side by side. The lesions also tend markedly to vary in kind in relapses and in recurrences. This is a striking point in the course of the disease. I have referred to these characteristics because they are totally different from those which mark the symptomatology of pemphigus. One cannot conceive of a pemphigus without blebs, perfect or imperfect in formation. There are but few of the exudative diseases that are more uniform in the production of their cutaneous lesions and that are more regular in their evolution than pemphigus. The evolution of the lesions of a disease, I contend, plays an important part in the history of that disease. It constitutes an integral part of the malady, and one that must not be lost sight of. It is this characteristic that I desire to lay stress upon in differentiating dermatitis herpetiformis from pemphigus. I believe that, if in a case of bullous dermatitis herpetiformis the course of the disease be watched for a long period, polymorphism of lesions will in most every instance sooner or later manifest itself to such a degree that pemphigus must be excluded in the diagnosis. But even in cases in which the evolution of the lesions is ignored there exists in dermatitis herpetiformis more or less conspicuous herpetiform features that are wanting in pemphigus vulgaris. If, therefore, the herpetiform features, the evolution of the lesions, and the course of the disease in dermatitis herpetiformis

be kept in mind, the question of pemphigus will seldom arise in diagnosis. It is altogether unreasonable and irrational to hold, as some observers have done, that dermatitis herpetiformis bullosa is merely a pemphigus. If such observers will closely observe and follow the process of the evolution to its termination, and, further, if they would note the relapses and recurrences which so commonly take place, they would not be so likely to confound these diseases.

CONCLUSIONS. The conclusions I would arrive at, briefly expressed, are :

1. That dermatitis herpetiformis is in most instances a disease with well-defined, tolerably constant clinical features which enable it to be distinguished from other cutaneous diseases.

2. That it is in most instances more closely allied to erythema multiforme than to any other generally recognized disease.

3. That one variety, the bullous, possesses features which resemble those of pemphigus vulgaris, from which disease, however, it differs in the peculiar inflammatory and herpetiform character of the cutaneous lesions, as well as in the tendency to polymorphism, the irregular evolution of the lesions, and in its course.

A CASE OF THORACIC ANEURISM.[1]

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LIZZIE B., colored, aged thirty-five years, married, no children, was admitted to the Howard Hospital September 4, 1894, on account of a painful swelling of the left sterno-clavicular articulation. Her family history was negative, but she gave a clear history of syphilis, contracted when she was eighteen years old, and for which she was under treatment for over a year. Since then she enjoyed fairly good health until about three months previous to her admission. During this time she suffered with severe headaches and increasing dull, boring, and neuralgic pain above the left clavicle and down the left arm and at the left sterno-clavicular articulation. Here a swelling made its appearance. These symptoms became so aggravated during the week previous to her admission that she was unable to sleep, and on account of dyspnœa she could not lie down. She was of medium height, poorly nourished, and decidedly debilitated. The swelling was about the size of an English walnut, situated a little below and over the left sterno-clavicular articulation. It was painful on slight pressure and gave the impression of containing fluid, especially on the upper surface. No pulsation was at this time perceptible. Its base was hard and indurated. The overlying skin was unaltered in appearance. The positive history of syphilis,

together with the rapid growth, the pain and indistinct fluctuation, and
the situation of the swelling, suggested gumma, and she was therefore
admitted to the surgical ward. Upon the following day, however, while
prepared to incise, curette, and pack in the usual way, and while speak-
ing of the importance of making a positive differential diagnosis between
aneurism and other growths in this situation, I was startled by detecting
a faint impulse on the apex of the swelling, synchronous with the pulsa-
tion of the heart. There was no bruit, murmur, or thud, and, beyond
the faint impulse, no sign of aneurism. Examination of the heart showed
no evidence of valvular disease. The radial pulses were full, regular,
and even, and not atheromatous. Enough counter-indication to incision
had been found, and the patient was treated expectantly for some days.
Absolute rest in bed was enjoined, with medium diet and gentle purga-
tion. While the tumor gradually increased in size the patient's general
condition seemed to improve. Her headaches and local pain became
less severe, and she expressed herself as feeling well enough to go home.
On September 15th, eleven days after her admission to the hospital, a
plaster cast was made (Fig. 1), and the following notes of her condition
were taken:

FIG. 1.   FIG. 2.   FIG. 3.
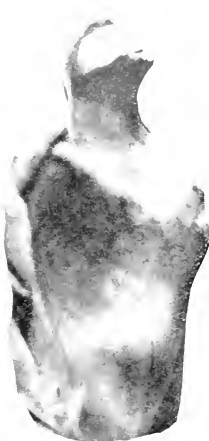
September 15, 1894.   September 30, 1894.   October 30, 1894.
Plaster-of-Paris casts in profile.

Inspection. A rounded lobular swelling, situated in the region of the
left sterno-clavicular articulation, extending over the median line to the
right of the manubrium. It is about the size of a lemon, and fills up
the suprasternal notch. It measures two and one-half inches in breadth
by three inches in length. The clavicle is slightly elevated above its
plane, and the whole left side of the chest is prominent. The tumor
pulsates most markedly over the main prominence, and the pulsation is

slightly expansile in character and synchronous with the heart-beat. The right external jugular vein is enlarged and pulsates, and a branch of the left jugular coursing over the tumor is also enlarged and pulsates.

Palpation. The most prominent part of the tumor is covered only by skin and fascia, the bony structures having been absorbed, and a portion of the growth may be compressed and pushed back into the crater-like opening. Feeble diastolic shock is felt over the tumor. Expansile pulsation cannot be determined. There is no thrill, but the whole præcordia pulsates. The apex-beat is very much accentuated and felt in the left anterior axillary line in the sixth interspace.

Auscultation. A faint bruit is heard immediately under the *right* sterno-clavicular articulation and not over the tumor. This bruit is accentuated on forced inspiration and disappears on forced expiration. All cardiac sounds are accentuated, and there is good closure of both mitral and aortic valves.

Percussion. With the exception of a small spot of impaired resonance one inch in diameter, immediately to left of sternum and two inches below the apex of the swelling, the tumor-dulness merges into that of the heart. Dulness does not extend beyond the right border of the sternum, except at the manubrium. There is pain over the spine of the scapula on percussion, with general soreness over the whole of the left shoulder. There is a good pulmonary resonance right and left posteriorly, but the respiratory sounds are weak on the left side; no râles.

The urine was examined and found normal.

It became evident that we were dealing with a saccular aneurism, arising probably from the ascending or transverse portion of the arch of the aorta, with erosion through the left sterno-clavicular articulation and a portion of the manubrium, and that it had developed in such a manner as not to involve the vagus or recurrent laryngeal nerves.

The absence of many of the physical signs of aneurism, which continued to be a marked feature of this case, made it one of unusual interest. The pupils were equal, and responded normally to light. Dr. E. L. Vansant kindly made a laryngological examination and reported the larynx and vocal cords normal. Digestion seemed undisturbed, and there were no gastric symptoms. There was no thrill, and the expansile nature of the pulsation was not well marked. The bruit heard over the second right costal cartilage could not be referred to the sac of the aneurism, since it could not be heard over the tumor. The rapidity of growth, and the danger of rupture indicated by the thinness of the tissues over the most prominent portion of the tumor, brought up the question of operative procedure. The advisability of electrolysis with a watch-spring was considered, but was abandoned as a *dernier ressort.*

The following treatment was ordered: absolute rest in bed; potassium iodide grains 5 three times daily; venesection, six or eight ounces every three days; low diet. The patient was not bled for two days, during which time severe pain in the shoulder and left arm developed. On the third day, September 18th, she was bled eight ounces from the external saphenous vein at the ankle, with great relief of this distressing symptom. Between September 18th and 30th she was bled four times, chiefly for the relief of pain, and each time with marked success. On the 30th, fifteen days later, a second cast (Fig. 2) was made, and the following note of her condition was taken:

Tumor: since last examination the tumor has equally enlarged. It has extended upward on the neck, and there is now a well-defined sulcus separating it into parts. The right external jugular vein is dilated and larger than when first examined. The tumor is the seat of distinct heaving, in which the thoracic wall shares. This heaving is synchronous with systole and is more marked with expiration.

Palpation. Expansile pulsation is quite evident. The diastolic shock is better felt than at previous examinations. There is no thrill. Pulsation greatly increased during forced inspiration.

Auscultation. At point of contact of first rib with the right edge of sternum there is during quiet breathing a harsh and rather long systolic murmur, which is inaudible during forced, held inspiration and expiration. This murmur is probably not aneurismal, but might be due to pressure on the pulmonary artery. No murmur is heard in either carotid.

Percussion. Tumor gives dulness. Below the tumor there is resonance in the left second interspace; third rib, flatness; third interspace, dulness extending to the fifth rib, through which gastric tympany may be obtained.

Heart. Apex-beat visible in sixth interspace, and the point of maximum intensity is one inch to the right of the anterior axillary line, extending in the interspace for a distance of three inches. It is diffuse, regular, and unaccompanied by thrill.

Right border of heart-dulness corresponds to right border of sternum; left border corresponds to a line drawn just without the anterior axillary line.

Auscultation of apex. First sound is long, but not so muscular as one would expect from size of heart. There is no murmur.

The second sound is well heard in the tricuspid and aortic regions, and is obscure in character. No murmur is heard in these regions other than that described under head of tumor.

Auscultation at angle of the left scapular gives loud heart-sounds, but otherwise is negative. Respiratory murmur over right base posteriorly is well heard. Over left base the breath-sounds are weak and feeble, and when a forced inspiration is taken numerous liquid râles are heard. The respiratory murmur of left side is weaker than on the right side. The left lung seems to be compressed posteriorly and downward.

It was now evident that the aneurism was steadily increasing in size, and the prognosis became very grave. The tissues overlying the tumor were so thin that rupture seemed imminent. The sulcus across the apex of the swelling was probably due to a part of the sterno-clavicular ligament which had not been absorbed. Full doses of potassium iodide with mercurial inunctions were ordered with liquid diet, bleeding as necessary for pain, and absolute rest in bed.

In ten days she was taking fifty grains of potassium iodide, and one drachm of mercurial ointment was rubbed in over abdomen, chest, and arms daily. A marvellous change took place. The tumor steadily decreased in size, and the patient's general condition improved daily. Once she became slightly salivated, and the mercurial was omitted for a few days. It was also found necessary to reduce the iodide to twenty-five grains daily on account of an acne. When she left the hospital, one month after this treatment had been started, a third cast was made,

which clearly shows the very marked diminution in the size of the tumor. (Fig. 3.) Two weeks later, November 15, 1894, Dr. Judson Daland kindly assisted me in making the following notes of her physical condition:

Upon inspection it is found that the tumor has diminished about two-thirds in size, and the impulse is correspondingly decreased. The appearance of the superior portion of the chest in front is also materially altered, the most prominent point at present being situated immediately below the left sterno-clavicular articulation, which is sacculated, feeling like an exostosis from the manubrium, and is not painful to pressure. Immediately below this bony prominence a distinct pulsation may be felt, very like the apex-beat of a heart unaccompanied by thrill. The area would be described by a circle having a diameter of half an inch. The entire upper portion of the sternum is still bowed outward. At a point corresponding to the right edge of the sternum, on a level with the first and second ribs, a faint pulsation is felt, which becomes stronger as the mid-sternal region is approached, and is strongest in the fourth interspace, half an inch to the left of the left border of the sternum. Over this region a diastolic as well as a systolic shock can be felt, synchronous with the heart's action, but no thrill. It can be felt outward as far as the left mid-clavicular line. The apex-beat is diffused, violent, strong, and is felt in the seventh interspace in the anterior axillary line. The beat feels as though the heart struck the finger directly, and there is no thrill.

Percussion. A limited area of pulsation, immediately below the prominence and downward for a distance of one and a half inches, is flat, below which there is no impairment of the percussion-note for half an inch, and then comes normal sternal resonance. The right half of the manubrium is dull on percussion. In the left sterno-clavicular region there is marked dulness extending down to the second rib, at which point there is a small area of resonance. Below that there is a flatness extending down to the fifth rib. This whole area is within the left mid-clavicular line. There is resonance to the right of the sternum, excepting in the manubrial region, where normal pulmonary resonance is not met until the parasternal line is reached. In the ensiform region there is impaired resonance continuous with the dulness immediately to the left. The lower limit of this area is marked by the seventh rib.

Above the clavicle and sternum the tumor bulges into the left side of the suprasternal notch, lying under the sternal tendon of the left sterno-cleido-mastoid. It bulges slightly over the level of the clavicle and sternum. By pressing the finger in this region back toward the cervical vertebræ one feels a ledge for a distance of one full inch, which is without pulsation, painful to pressure, and feels hard.

Auscultation. In the first interspace at the right edge of the sternum the heart-sounds are heard with great distinctness. On long inspiration there is a distinct systolic murmur audible. In quiet breathing certain of the heart-beats are entirely without a murmur, and the murmur is best heard at the beginning of the expiration.

Directly over the swelling a blowing murmur is heard with systole during inspiration, but during expiration the heart-sounds are clear. This is the first time any murmur was heard over the swelling, and it is doubtless of aneurismal origin. The second sound is rather sharp. Over the pulmonic cartilage the second sound is accentuated and somewhat

ringing; no murmur. The heart-sounds are better heard below the manubrium, and at the ensiform both first and second sounds are heard equally well, the second sound being especially accentuated, but no murmur is audible.

The above examinations were all made in the standing posture.

When sitting, auscultation over the aortic cartilage reveals rather feeble heart-sounds and a faint systolic murmur. Over the swelling a distinct blowing, rather harsh systolic murmur is audible, coincident with each systole of the heart. The second sound is heard immediately thereafter, and is clear over the pulmonic cartilage. The systolic murmur at the aortic cartilage has a slightly higher pitch than that over the swelling. As the stethoscope is carried downward on the left to the third interspace near the sternum the systolic murmur is best heard. Over the apex-beat no distinct systolic murmur is audible, but there is a grating sound like that produced in hearts that are hypertrophied or dilated. Over the third interspace, in the left parasternal line, there is a distinct blowing, wavy, systolic murmur, differing markedly in quality and intensity from that heard over the swelling. There is no murmur in the carotids.

From these auscultatory signs it would appear that the systolic murmur heard over the swelling is of aneurismal origin because of location, quality, and want of distribution of the carotids. Further, the systolic murmur of different quality heard in the third interspace in the left parasternal line, having a wavy character, is probably due to compression of the pulmonary artery, as the tricuspid and mitral areas are free from murmur. The origin of the murmur heard at the aortic cartilage is doubtful. In the scapular region, near the inferior angle, a distinct systolic murmur is audible. In the axillary region no murmur is audible.

There is no difference in the radial pulses as regards rhythm or volume. The left is rather deeply situated and is hard to feel. The right is more superficial and is markedly thickened.

After leaving the hospital the patient led a quiet life, and took bichloride of mercury, one-twenty-fourth of a grain, and potassium iodide, gr. xx, three times daily.

This treatment was faithfully followed, with no marked change in her general condition or in the size of the swelling during the winter and spring and early summer of 1894. In August, however, thinking that she was cured, she gave up treatment, and October 15, 1895, she returned to the hospital for relief of distressing symptoms.

The swelling had increased considerably in size, and was very painful. She suffered much with headache, pain in left shoulder and arm, aggravated dyspepsia, a metallic, barking cough, and on two occasions during paroxysms of coughing she brought up a mouthful of bloody expectoration. At this time no marked changes were noted in the physical signs. She would not consent to remain in the hospital, so she was placed upon the old mixture of bichloride of mercury, one-twenty-fourth of a grain, and potassium iodide, gr. xx, three times daily.

She improved slightly under treatment until November 16th, when she was again admitted to the ward, suffering intense pain over left side of neck and left shoulder, radiating down the arm. The tumor was about the size of a small lemon, rounded, somewhat sacculated, firm, and tense, giving expansile pulsation, and painful on firm pressure.

She was bled on the 17th, 21st, and 28th, eight ounces each time, with marked relief of pain. At the same time one drachm of mercurial ointment was rubbed in the abdomen, arms, and legs, and she was given sixty grains of potassium iodide daily.

The tumor increased in size, and on December 4, 1895, her condition was as follows: the tumor is a rounded, globular swelling about the size of an orange, measuring three and one-fourth inches in all directions over its surface. It bulges above the clavicle, which is raised above its plane, and it fills up the suprasternal and supraclavicular fossæ. It is less firm and tense than at last examination and gives expansile pulsation.

The left shoulder droops, and there are general pain and tenderness on pressure.

The area of flatness may be described by a line drawn from the middle of the left clavicle to the fifth rib just above the nipple, from here horizontally to the mid-sternal line, then to the base of the tumor, and around it to the right sterno-clavicular articulation. Below the tumor this flatness merges into cardiac dulness, which extends to the left anterior axillary line as far as the seventh rib. Here the apex-beat can be seen and felt strongly pulsating. The first sound is long and muscular, unaccompanied by murmur. A decided bruit can be heard all over the area of the tumor-flatness, and there is faint diastolic shock. A short medium-pitched systolic murmur is heard to the right of the sternum at the second costal cartilage. This murmur is transmitted into the right carotid. The second sound is sharp and accentuated.

Bronchial breathing with rough, moist râles is heard under the outer half of left clavicle down to third rib. Posteriorly there is general broncho-vesicular breathing with moist râles on left side.

On right side posteriorly and anteriorly the breath-sounds are more pronounced, somewhat rough, but unaccompanied by râles.

Conclusion: a large saccular aneurism, its upper portion having eroded the bony structure. The left lung is compressed posteriorly and laterally, and the heart is pushed down and out. The aneurism probably arises from the ascending or transverse portion of the arch.

The patient improved steadily under treatment, and on December 24th was discharged in a comfortable condition. The tumor became firm and slightly smaller. The pain had ceased in the neck, arm, and shoulder.

In spite of warning she undertook housework, and January 15, 1896, she again returned to the hospital on account of pain. At this time another plaster cast was made. (Fig. 4.) She improved under treatment, and left the hospital at the end of ten days. She then reported weekly, and continued to do well until April 7th at 4 A.M., when she suddenly developed agonizing pain under the left axilla, which increased in severity during the day, requiring one and a quarter grains of morphine with atropine for relief. There were nausea and vomiting with painful cough. The breathing was labored and rapid. Temperature was normal. Pulse 112. Respiration 36. The physical signs could not be differentiated owing to the loud breathing. I suspected an acute pleurisy or else a sudden dissection of the arterial walls involved in the aneurism and consequent increase in the size of the tumor. The chief pain was situated in the *right* axillary region. She was bled twelve ounces, and morphine and atropine were given

subcutaneously for relief of pain, and the next day, April 8th, she was again sent to the hospital, and the following notes were made of her condition :

April 8, 1896.   Breathing stertorous, labored, frequent, averaging 26, and frequently interrupted by a loud ringing cough.   Tumor over upper portion of sternum is the size of large orange and is more than a hemisphere.   During cough it becomes tenser and larger.   Impossible to judge of cyanosis.   Matrix of nails is normal.   In sitting position with the head bent downward the chin rests upon the tumor. There is marked pulsation, which upon palpation feels like the heart. The diastolic shock is marked.   Expansile pulsation is well felt.   The wall of the sac is made up of skin, fascia, and connective tissue, and has an apparent thickness of a quarter-inch.   The thickest portion is in the centre.   Anteriorly there is no thrill.

Fig. 4.
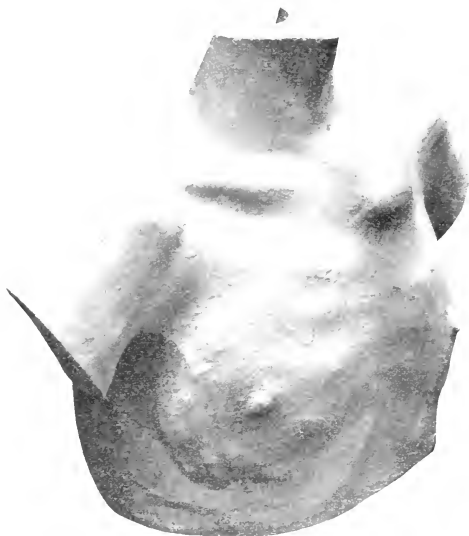
Plaster cast made January 17, 1896.

Auscultation.   Over central portion of tumor is a strong, low-pitched, systolic murmur mixed with the cardiac first sound.   Second sound accentuated.   A systolic murmur of different quality and of higher pitch is heard below the tumor to left of sternum.   A murmur is heard in the left carotid.   No aortic diastolic murmur is here audible.   At ensiform there is a murmurish sound of diastolic time.   The apex is plainly felt as low as sixth rib outside of nipple-line, occupying an area of two inches in diameter.   It is forceful, and indicates that the

heart is closely applied to chest. No thrill, no murmur, but the mus-
cular element of the sound is increased.

Pupils symmetrically contracted, *probably due to morphine.* Pulses
irregular in time, and the right pulse much smaller in volume than the
left. At times the pulses are synchronous and again are not synchro-
nous.

Lungs. Impaired resonance over both bases. The air enters both
lower lobes with the same degree of power. The breath-sound is harsh,
unaccompanied by râles, and there are no friction-râles. Occasionally a
large rhonchus is heard apparently from a compressed trachea or one of
its branches. A prolonged, loud, harsh murmur is heard midway be-
tween the border of the scapula and the spinous process of the vertebra
on the *right* side, and extends from the fifth to the twelfth dorsal ver-
tebral spines. During quiet breathing but little air enters either base.

Fig. 5.

Photograph taken April 11, 189.5.
Note the collar of flesh, the drooping shoulder, and the forward position of the clavicle.

Over the left scapulary region there are signs of compressed lung, and
the heart-sounds are plainly audible. Dr. A. W. Watson kindly made
a laryngological examination and reported that he found the vocal cords
normal. There is a slight deviation of the trachea to the right.

Treatment ordered : mercurial inunctions and iodide of potassium.

Two days later, April 10th, she was bled six ounces, for pain, at 8 A.M.

At 1 P.M. on the same day a violent attack of dyspnœa came on very
suddenly, with sharp pain in right axillary region. The patient was
deeply cyanosed, and she seemed about to die of asphyxia. A vein was

immediately opened and twenty-eight ounces of blood drawn. During the bleeding the cyanosis disappeared, breathing became easy, and pain subsided. The tumor, which had been firm and unyielding, became flaccid, and patient rested easily. Later in the afternoon she slept for two hours. On the following day, April 11, 1896, the photographs were taken. (Figs. 5 and 6.)

May 12th. The patient has steadily improved under treatment, and, in spite of frequent venesections for the relief of slight attacks of dyspnœa and pain, she is gaining strength. She is now able to be out of bed and walk about the ward for a few hours daily. The inunctions were pushed to salivation and then stopped. The potassium iodide has been gradually diminished until, on the 5th of May, she was taking none at all. At this time a tonic pill of iron, quinine, and strychnine was ordered. Her appetite is good, bowels regular, and all functions normal.

FIG. 6.

Photograph taken April 11, 1896.

The wall of the sac seems to be firm and elastic, and about from one-half to one-quarter of an inch in thickness. The walls seem to be of uniform thickness. There is no point of marked thinning indicating danger of rupture externally.

The sac has not changed in size or appearance, but the walls have become firmer and thicker under treatment. Frequent examinations of the urine have been made during the progress of the case with negative results.

The aneurism is undoubtedly a large one, and the fact that such extensive erosion has taken place, allowing protrusion of so large a part of it, accounts in some measure for the absence of many pressure-symptoms, and, therefore, absence of pain. Pepper (*American Text-book of*

the Theory and Practice of Medicine) cites two cases illustrating this point—one in which an aneurism of the ascending arch had eroded the sternum, appearing externally as a large tumor, and finally rupturing externally without having caused any decided subjective symptoms excepting dyspnœa; another in which the tumor had reached such a size as to cause dulness over a large part of the thorax to the right of the sternum without causing pain.

The question of the location of the aneurism is interesting. An aneurism of the ascending arch causes erosion to the right of the sternum. In this case the erosion is of the left sterno-clavicular articulation and contiguous structures. The physical signs show that the larger part of the sac is within the thorax and to the left of the sternum. The fact that so many pressure-symptoms have been and remain absent argues against the view that it is an aneurism of the transverse arch, because, owing to the small space between the sternum and the spinal column, tumors in this region usually give rise to severe pain and other symptoms of pressure. One would expect an aneurism of the descending arch to develop posteriorly.

Occasionally small aneurismal dilatations of the sinuses of Valsalva have been noted, and Bramwell has reported one case in which a large aneurism had its origin at this point.

Gray thus describes the sinuses of Valsalva : " Between the semilunar valves and the commencement of the pulmonary artery are two pouches or dilatations, one behind each valve. These are the pulmonary sinuses *(sinuses of Valsalva)*. Similar sinuses exist between the semilunar valves and the commencement of the aorta ; they are larger than the pulmonary sinuses. The pulmonary valves are situated behind the junction of the left third rib with the sternum."

It has occurred to the writer that this aneurism may arise from one of the pulmonary sinuses of Valsalva. This might account for many of the peculiar features of this case, namely, the development of the sac anteriorly and to the left of the sternum ; the fact that the sac fills up a large portion of the upper half of the left thorax ; the absence of involvement of the vagus and recurrent laryngeal and of the sympathetic nerves ; the peculiar and unusual murmurs ; the absence of irregular and asynchronous action of the radial pulses ; the absence of tracheal tugging.

An aneurism in this situation, unless markedly sacculated and the aneurismal opening from the vessel very small, would give rise to violent attacks of dyspnœa. This has always been a marked feature of the case, and especially so during the last few months. It is fair to presume that the opening into the sac has increased materially in size in this time.

The writer does not mean to urge this view of the case. It is mentioned only as being worthy of consideration. It seems more probable

that the aneurism arises from the left lateral wall of the ascending arch, and has developed anteriorly and to the left, a portion of its upper part also bulging into the right pleural cavity just below the right sterno-clavicular articulation and to the right of the manubrium. Also, that the opening from the aorta into the sac was at first very small, accounting for the fact that for a long time no aneurismal bruit was heard, and that the bruit which became audible later was due to increase in the size of the opening, allowing a stronger current of blood to enter the sac. This theory is borne out by the murmur which, in the pulmonary area, was noted November 15, 1895, and which was heard most distinctly while the patient was in the sitting position, slightly bent forward, causing pressure by the sac upon the pulmonary artery.

The question of the probable origin of the aneurism is now, however, of minor importance in comparison with the actual condition of its walls and the size of the opening into the vessel from which it springs. Upon the solution of these questions should depend our decision as to the propriety of attempting to obtain coagulation of blood and the deposit of the white, laminated fibrin upon the walls of the sac by means of Macewen's method. One or more strong needles are used in this method to pierce the sac, in order to scratch and irritate the inner walls as much as possible. These needles may be allowed to remain in from one to four or five hours, or they may be withdrawn immediately. Macewen reports consolidation and cure in two cases (*Lancet*, November 22, 1890), one an aneurism of the thoracic aorta and the other of the subclavian. He also reports another case of femoral aneurism, in which the autopsy showed that the deposition of the white, laminated fibrin was greatest where the sac-irritation had been most thoroughly applied.

Weir and Page (*New York Medical Journal*, May 7, 1892) report an aneurism of the ascending aorta treated without success by this method. The needling was done three times during the first week of treatment, and as no improvement took place it was not tried again. The patient died from rupture of the sac about two months later. The autopsy showed an aneurism measuring $6\frac{1}{2}$ by 8 inches and filled with a post-mortem clot. The walls were very thin and the rupture had taken place posteriorly. Nowhere was there to be seen more than a trace of fibrinous deposit and no evidences of the needling were visible.

The method is a rational one, however, and has been successful in the hands of its originator and in a few other cases. It seems to me that it is applicable only under certain conditions, and these are a thick-walled sac, a sac in which there is only a moderate amount of expansile movement, and especially and only when the opening from the vessel is small. In order to determine the latter point in the present case arrangements have been made to have a radiograph taken of the thorax. There is a chance of gaining important information by this

means, especially if there are calcareous deposits and atheromatous changes in the walls of the aorta or of the sac. In addition a radiograph will show the changes which have taken place in the bony structures by reason of erosion and internal pressure. The writer proposes to make a supplementary report based upon this picture should it prove successful.

One word in regard to treatment. That which has been carrried out in this case has proved so successful that some hesitation is felt in making any change.

A short time ago it was thought advisable to stop the mercury and the potassium iodide on account of intolerance. Since then the patient has been taking only a tonic pill of iron, quinine, and strychnine. It is proposed before returning to the mercury and iodide to try the effect of calcium iodide in full doses. This remedy has recently been used with apparent success in these cases. The result will be reported at some future time.

The points of unusual interest in the case which has been related are as follows :

1. The length of time during which the aneurism has been known to exist It has been two years since the first symptoms appeared, and the patient has during the greater part of the time been able to be about on her feet, doing light work.

2. The almost entire absence of the usual pressure-symptoms. There has been no evidence of involvement of the vagus or recurrent laryngeal nerves or of the sympathetic nerve. Occasionally there has been pain radiating over the left shoulder and down the left arm, showing that the cervical plexus has been involved.

3. The remarkable result of the therapeutic measures, as shown by the decided decrease in the size of the tumor and the repair of the eroded bony structures at one time during the progress of the case. This point alone is sufficient to make the case worthy of record, and one which may be called unique in the history of thoracic aneurisms.

4. The decided benefit gained from venesection. On one occasion at least the patient's life was undoubtedly saved by the prompt opening of a vein and the withdrawal of twenty-eight ounces of blood.

5. The question of the origin of the aneurism.

I desire to express my thanks to Dr. A. W. Booth, to whom I am indebted for the plaster models from which Figs. 1, 2, and 3 were made ; also to Dr. Keffer for the model of Fig. 4. Dr. H. C. Williams, resident physician, has rendered valuable assistance in many ways, and I take this opportunity to express my appreciation of his work.

REVIEWS.

Two years ago the writer, in reviewing Musser's *Diagnosis* in this Journal, bespoke for it a cordial reception from the professional public. The prediction has come true. The evidence is the exhaustion of the first edition and the publication of a second within a little over two years.

This second edition shows careful revision. Not only have typographical errors been corrected, but there is much additional matter in the text, and several new illustrations have been added, so that the volume is larger than the former one by fifty pages.

We would speak with especial commendation of the alterations in the illustrations. Several new ones have been added that are of great value; *e. g.*, the diagrams under the head of Diseases of the Heart. Inferior cuts have been replaced by superior ones, as is seen in the illustrations of the emphysematous and phthisical chests. And several of the time-honored and shopworn illustrations of tube-casts and urinary deposits have been withdrawn, and in their places we see fresh, clear original cuts. If we were disposed to criticise, we should say that Musser has been less fortunate in his representation of the blood in various diseases. The cut from Rieder, on page 736, gives but an imperfect idea of the plasmodium, and the plate opposite page 812 is scarcely more successful. The plasmodium can best be studied in the fresh specimen, and a figure representing it in this state would be better than either of those we have mentioned. The figures from Golgi (page 815) are, to our mind, much truer to nature, though perhaps a trifle diagrammatic. We have seen no representations of the plasmodium that compare for purposes of study or of teaching to those in Thayer and Hewetson's monograph. The description of the plasmodium given by Musser in the text is, perhaps, a little too meagre. The plate representing leukæmic blood (p. 744) would be improved, we think, had a better field been selected. We admit that we often see many such fields even in carefully prepared specimens. But for a text-book illustration one is justified in picking out a place where all forms are clearly distinct—*i. e.*, a typical place. In the figure in Musser the running together of the red corpuscles gives one the impression of a poorly prepared microscopic specimen.

As was said in the review of the first edition, we regard as of the highest value the general introductory chapters and the chapters introductory to the study of the diseases of the various organs. Too often the physician, in his haste to get at the individual disease, skips the introduction. He who does that with Musser's work misses much that is valuable and fails to obtain that broad, general view of the subject that it is the evident desire of the author we should obtain. As bearing directly upon this point and containing much of truth, we quote from the preface :

" Diagnosis, being a practical art, should be held to include not merely the recognition of a disease or a complication of diseases, but also a determination of the *health-value* of the patient. Thus in a case of pneumonia not only should the presence of the malady be established, but the functional condition of all the organs should also be investigated, in order that the rational treatment may be prescribed and a rational prognosis given. In other words, the physician should never forget that a patient is a unit, comprising closely interacting organs, and that the response to treatment will be satisfactory in proportion to its adaptation to the condition of the entire organism."

" Success in treatment follows only upon diagnosis of the most comprehensive character, and, furthermore, the *status præsens* should be clear to the physician, not only at the outset, but also at every stage of the disease."

He who reads Musser aright will, we believe, get this broad conception of disease, will see the connection between " closely interacting organs," and will be enabled to make the comprehensive diagnosis that leads to rational treatment.

The work is fully up to date in matters of bacteriological, chemical, and microscopical diagnosis. But it is to be remembered that Musser's book embraces as well the facts of physical diagnosis—inspection, percussion, auscultation, etc.—and that the value of the subjective history is clearly set forth. It combines, therefore, the merits of works devoted solely to chemical and microscopical diagnosis, those dealing mainly with physical diagnosis, and those laying chief stress upon the subjective history. It was a difficult task to effect such a combination. That Musser has succeeded will be generally admitted, as the success of his first edition attests.

In reading the book we have marked several places as worthy of special commendation. We note as particularly vivid word-pictures the description of the actions of the healthy baby as compared with those of the rickety child, or the sufferer from meningitis (p. 58) ; the description of the typhoid state (p. 109) and of internal hemorrhage (p. 182) ; the complete and systematic exposition of hæmoptysis (p. 302).

His explanation of the subject of the reaction of degeneration is clear and easily comprehended by the student (p. 842). We fully agree that the sphygmograph is an instrument whose value depends upon the personal experience and skill of the physician employing it (p. 396).

We suppose every reviewer feels that he has not done his duty unless he hunts carefully and succeeds in finding some little statement that is incorrect, or at least one on which he may " beg the gentleman's leave to differ." So we would suggest that our author has left us a little in the dark as to whether he expects us to make diagnoses of capillary

bronchitis and of broncho-pneumonia, distinguishing them as two patho-
logical and clinical entities (pp. 308 and 325). While the statement
is certainly true that a diastolic murmur can generally be set down as
organic, there are, we believe, occasionally met with, diastolic murmurs
that are not organic (p. 386). The statement that the capillary pulse
is a "sign of aortic insufficiency" (p. 390) is a little misleading, as it
appears to mean that the finding of a capillary pulse means aortic re-
gurgitation. Frequently a capillary pulse may be seen in conditions
other than this particular valvular lesion.

But these are trivial matters. The book as a whole and in its details
is of superior merit. It has come to stay, and is destined, if the author
will constantly keep it abreast of the times, to go through many sub-
sequent editions.   J. B. H.

MEDICAL JURISPRUDENCE FORENSIC MEDICINE, AND TOXICOLOGY. By
R. A. WITTHAUS, A.M., M.D., and T. C. BECKER, A.B., LL.B., with the
assistance of many collaborators. Volume IV. 8vo., 860 pages and indexes.
New York: Wm. Wood & Co., 1896.

THIS is the concluding volume of the most comprehensive work on
legal medicine yet issued under American auspices. In this age of
"Systems" it is not surprising that a topic so largely scientific and com-
prising the border-line between law and medicine should be treated in a
comprehensive manner. The work, as a whole, has exhibited the ad-
vantages and defects of the method. When many specialists con-
tribute, there will be apt to be inequality in the literary and scientific
execution of the various articles. All who are successful or eminent
in a particular field are not necessarily capable of communicating their
knowledge clearly and elegantly. It is presumed to be the function of
the editor to supply the finishing touches, but he, too frequently, neglects
this drudgery. Nor is it certain that, even under the best editing, the
selection of collaborators will be made with an eye single to the inter-
ests of the work. Personal feeling will always have some sway, and
hence most of these encyclopædic contributions to science have a pre-
dominance of contributors local to the editor's field of labor.

In the volume under review these general criticisms are not germane,
for it is entirely the work of the senior editor of the System. The
reputation of Dr. Witthaus is a sufficient guarantee of his ability to
deal properly with the topic to which the volume is entirely devoted.
He unites a large experience as a toxicologist with thorough familiarity
with general chemistry, both as a teacher and writer, and we turn over
the pages of the book with the assurance that the expert will find it a
valuable guide.

The books open with a historical essay in which is given some inter-
esting information concerning the celebrated poisoners of antiquity,
though, of course, a large part of these stories is subject to the uncer-
tainties that belong to all accounts of the marvellous or startling. In
the chapter devoted to General Considerations we note some statistics of
poisoning as recorded in New York City, from which it appears that
illuminating-gas has become of late years one of the most frequent
causes of accidental and suicidal poisoning. This is probably due to

the substitution of water-gas for the old-fashioned coal-gas, the latter having much less toxic power.

The portion of the book devoted to discussions of definitions and limitations of toxicology, to the manner of action of poisons, treatment, diagnosis, methods and indications of autopsy are all comprehensive and excellent, and we need not review them in detail. In describing the methods of conducting the scientific investigation for the detection of any poison, Dr. Witthaus enters into some details concerning which we are partly in agreement and partly not. He observes that the analysis should be made by a chemist of experience, who is also a graduate of medicine. We may accept this as a safe rule, but the latter qualification is often not regarded as essential. We cannot, however, agree with the next statement, namely, that the analysis is best made by one expert, and that the joint investigation by two analysts is to be disapproved. It is possible that such arrangements may, at times, lead to delay and even to unpleasant differences of opinion; but we think that in view of the unseemly contests between opposing experts in important trials a great advantage is gained by having two competent witnesses to the analytic results or pathologic conditions. This is especially true when the tests or observations must be given by description only. In many cases of poisoning a portion of the material which has been administered may be reserved by the expert and submitted to the court for further tests, if need be; but in many other cases no such tangible evidence can be brought forward; the tests are mere color-changes which must be described from notes, or, if shown at all, it must be by the use of material not obtained from the body examined. In this class of cases, it seems to us, great advantage will result if the concordant observation of two competent persons is available. Another contingency that may arise is the inability of an expert to testify, by which proper trial may be impossible. In one case of which we know, an expert was too sick to be present at the trial; fortunately another analyst had been joined in the investigation and assisted at it throughout, and the trial went on satisfactorily. In another case the expert who conducted an investigation died suddenly before the trial took place, and it was impossible to pursue the prosecution.

Elaborate descriptions are given for the extraction of organic poisons. The liability of standard, and presumably pure, reagents to contain poisonous bodies shows us one of the pitfalls of this line of work and leads us to regard with doubt many of the earlier investigations in this field. As a striking example of this source of error, we may quote from a recent paper by Vaughan and Perkins, who state that a sample of ether, which was intended for analytic use, contained so much of a poisonous impurity that the residue from fifty cubic centimetres killed a guinea-pig in ten minutes.

The question as to which is the most important poison may be considered answered by the fact that 184 pages (more than one-fifth of the book) are devoted to consideration of arsenical compounds. In discussing the lethal dose of ordinary arsenic (arsenious oxide), Dr. Witthaus rejects the case reported by Dr. Castle, upon the authority of which most toxicologists have fixed the minimum lethal dose for an adult at 0.13 gramme (2 grains). He considers that a recently produced abortion had much to do with the death of this patient.

We regret to note that no space is given to the consideration of

chronic lead-poisoning. It is passed over with the allusion that it is industrial and not forensic, but the topic has generally been included in treatises on toxicology proper, and certainly the analytic methods, which are difficult and important, should be described. The detection of lead in cases of acute poisoning is easy, but the minute amounts of lead encountered in cases of chronic poisoning require special methods, and we would have been glad to have had them discussed by a competent authority. The liability of lead-compounds to occur in small amounts in food, either by accident or adulteration, makes the topic one of more than industrial importance.

Perhaps the most interesting part of the book is the discussion of the analytic questions that arose in the Buchanan case. Dr. Witthaus was the principal witness for the prosecution, and it was in this trial that the lawyer-doctor, O'Sullivan, shot, meteor-like, across the forensic sky. The value of Dr. Witthaus's color-tests for morphine was combated by Dr. Vaughan, who contended that the same reactions could be obtained from putrefactive products, especially those resulting from decomposition out of contact with air. We need not enter at length into the details. Dr. Witthaus quotes liberally from the official report, claiming, and we think rightly, that the "imitations" that Dr. Vaughan obtained before the jury by applying the various morphine-tests to indol were not such as to invalidate the value of these tests when properly applied. Yet Dr. Vaughan, in the recent edition of his work on *Ptomaïns*, referring to this case, asserts broadly "that all of the tests obtained by the experts were duplicated with putrefactive products." We agree with Dr. Witthaus that this statement is disingenuous.

There is no doubt, however, that the color-tests for alkaloids must be conducted with precision and with constant regard to the possible fallacies from ptomaïnes, and it is also clear that for a time, at least, such testimony as that given by Dr. Vaughan in the Buchanan trial will imperil the evidence given by the prosecution. With mineral poisons some portion of the substance may be recovered from the test-liquids and shown in a tangible form, but the tests for alkaloidal poisons are mostly "swan-songs"; that is, the poison is destroyed in giving evidence of its presence, and all that can be brought before a jury is the description of color and forms, with the possibility of dispute as to the exact observations.

The book will be of good service to toxicologists and will, among other advantages, serve to give uniformity to analytic methods. The literary style is excellent. The new spelling, of which Dr. Witthaus was an early champion, is used *in excelsis*—namely, sulfur, sulfid, iodin, iodid, etc.

The original sources have been consulted in many instances, with the result that more than one case which has been doing duty in toxicologic literature has lost its value.

The general typography is good, as regards the text proper; but the foot-notes, which are very numerous, are not so satisfactory. The index is rather scanty. Few illustrations are given, and most of them could have been omitted. The pictures of mercury and arsenious oxide deposits (pp. 494–95), morphine crystals (p. 724), and strychnine (p. 781), are mere smudges which can be of no benefit to a tyro and no use to an expert. In fact, drawings of crystals, that can be readily obtained for actual observation, seem to us to be a waste of money and labor.

The proper function of illustration in a work of this character is to give accurate drawings of objects that cannot be readily obtained or prepared.   H. L.

PTOMAÏNS, LEUCOMAÏNS, TOXINS AND ANTITOXINS; OR THE CHEMICAL FACTORS IN THE CAUSATION OF DISEASE. By VICTOR C. VAUGHAN, Ph.D., M.D., Professor of Hygiene and Physiological Chemistry in the University of Michigan and Director of the Hygienic Laboratory; and FREDERICK G. NOVY, Sc.D., M.D., Junior Professor of Hygiene and Physiological Chemistry in the University of Michigan. Third edition, revised and enlarged. 8vo., pp. 604. Philadelphia and New York: Lea Brothers & Co., 1896.

PROBABLY no department of pathology has a more living interest to the practitioner of medicine at the present time than that which has to do with the various intoxications of the body and with the structural and functional disturbances directly resultant therefrom.   With the growth of our knowledge of the bacteria and of their relations to disease, evidence has continually accumulated to the effect that their principal action upon the tissues is due to certain poisonous substances (toxins) elaborated in the course of their growth, and there is even now much to support the view that the specific peculiarities of the lesions of the various infectious processes depend chiefly upon the individual peculiarities of the poisons concerned.

Again, recent researches into the etiology of many of the lesser maladies which clinicians have been wont to class as " minor ailments," attributable in many instances to digestive disorder, are in reality dependent upon intoxication of the system by various toxic principles elaborated in the course of alimentary putrefaction or as the result of imperfect nutritional metabolism.   In this category may now be classed many of the temporary causes of indisposition so frequently confronting the general practitioner, such as headache, malaise, nervous hyperexcitability, neurasthenia, etc.; conditions often slight in themselves, but of much real moment as incapacitating the sufferer for the full performance of his work.

It is with the various poisons responsible for these conditions that the book before us deals, and in it we have the most exhaustive as well as the most recent presentation of the subject with which we are acquainted.   That the importance of the subject and the manner of its treatment by Vaughan and Novy are appreciated is attested by the fact that the work is now in its third edition.

After the usual preliminary chapters introductory to the subject-matter of the work, which include among other things a careful historical sketch of the growth of our knowledge of the bacterial poisons in general, we are introduced to an account of the poisonous principles which have been found in various articles of food and which have from time to time given rise to cases of serious and often fatal poisoning. Here we find described the effects produced by the eating of poisonous mussels, oysters, eels, fish, sausage, meats, cheese, milk, ice-cream, bread, etc., and are given an insight into the nature of the poisons concerned

in their production. In the chapter which follows, and which is new in the present edition, is given a brief statement of the most approved method of detecting the poisons in suspected foodstuffs.

In the four succeeding chapters, which occupy nearly one-fourth of the book, we have a detailed statement of the relation of the bacterial poisons to infectious diseases, in the course of which each disease is separately treated and the present status of our knowledge of its toxins is recounted. Here, too, we find a statement of the principles of immunity, of antitoxins and serum-therapy, as well as some account of the general germicidal power of the blood-serum and of those of its constituents to which this power is attributable. These chapters are of great interest in view of the rapid progress which has recently been made in our understanding of these most important subjects.

To the chemist and toxicologist the five chapters which follow are of especial interest, since they detail the methods of extracting ptomaïns, toxins, and leucomaïns from mixtures of organic substances and present their various chemical reactions. To the close similarity as regards chemical reactions of some of the bacterial products and a number of the alkaloid poisons a special chapter is devoted.

The work closes with a short discussion of some of the " autogenous diseases," by which are meant those diseased conditions induced by poisonous substances produced within the body by its own cells in the course of their metabolism. Here we find a statement of the poisonous effects of pepton, albumoses, " peptotoxin," and of the various members of the uric acid and creatin groups of leucomaïns.

While it is impossible within the compass of a review more than to outline the scope of a work like that before us, it is hoped that enough has been said to show the vital interest of the subject treated and to indicate the manner of its presentation.

An exhaustive bibliography and a carefully prepared index materially increase the usefulness of the book.   J. S. E.

A TEXT-BOOK OF HISTOLOGY, DESCRIPTIVE AND PRACTICAL. FOR THE USE OF STUDENTS. By ARTHUR CLARKSON, M.B., C.M. Edin., formerly Demonstrator of Physiology in Owen's College, Manchester; late Demonstrator of Physiology in the Yorkshire College, Leeds. Pp. 554. With 174 colored illustrations. Philadelphia: W. B. Saunders, 1896.

IN the preface of the book before us the author states that his purpose " in this work has been to furnish the student of Histology, in one volume, with both the descriptive and practical parts of the science."

With the scope of the book thus clearly outlined we are somewhat restricted in the range of our criticism, for it would be an act of great injustice to the author to condemn his book because it does not meet the requirements of the specialist, when it has been designed expressly for the student whose needs are widely different. It behooves us, therefore, first to ascertain the needs of the student, and then to determine in what manner the author has acquitted himself of his task.

A book adapted to the understanding of one about to enter upon a

course of scientific study should, above all else, be clear and concise, with explicit directions regarding technical matters, and without lengthy discussion of complex problems or polemical subjects.

After a careful perusal of Mr. Clarkson's book we are reluctantly forced to the conclusion that it does not meet all of these requirements.

Chapters I. and II. are devoted to the consideration of matter pertaining to the preparation of tissue for microscopic study. Formulas for many of the hardening, decalcifying, injecting, and staining solutions in general use are given, but the directions as to their manner of employment are vague and incomplete. We feel quite confident that a student having no other guide than Mr. Clarkson would soon become involved in difficulties that could have been prevented by a few well-worded sentences.

To illustrate our remark we have space for but a single example. On page 13 the author mentions the methods for hardening tissue in saturated watery and alcoholic solutions of corrosive sublimate.

In the use of such solutions precipitation of the corrosive sublimate is quite likely to happen, and if the precipitate be not removed, the sections will be valueless for microscopic study, and yet the author has given no directions to this end.

The animal cell, the blood, and the lymph and chyle are treated of in Chapter III. The most important part of this chapter, that treating of the blood, is a lamentable failure.

The author's labored efforts to give a brief and concise description of this important tissue are painfully manifest. He seems to lack the complete knowledge of the arts of selection and condensation which is essential to the construction of a successful work of this kind. Nowhere throughout the book is this fault so evident as in the description of the origin of the red blood-corpuscles and the primary blood-vessels.

The conclusions at which we arrive from Mr. Clarkson's description are that the red blood-corpuscles are epithelial cells derived primarily from epithelial cells of the mesoblast, and that the cells forming the lining of the bloodvessels and the walls of the capillaries are also epithelial cells derived from mesoblastic elements indistinguishable from those that give birth to the red blood-corpuscles.

This placing of the red blood-corpuscles among the epithelial cells is new to us and somewhat startling, as we had always considered them as belonging to the category of connective-tissue cells.

In Chapter IV. we find described as "simple squamous epithelium" the cells covering the free surfaces of serous membranes and lining the heart, the bloodvessels, and the lymphatic vessels. At the present time many eminent pathologists regard these cells as a form of connective tissue, and they no longer refer to them as epithelium, but as endothelium.

Epithelium and connective tissue differ from one another in many essential features; indeed, they represent two distinct types of tissue, and throughout life each retains it own distinctive characteristics. In his excellent text-book on *General Pathology* E. Ziegler states clearly and succinctly the principle of an almost universally accepted doctrine, which we take the liberty to quote: "Every tissue capable of growth furnishes formative cells only for tissue like or closely allied to it."

Thiersch, Baumgarten, Raab, Thoma, and others have conclusively

proved that frequently in the process of repair the endothelial cells proliferate, and the resulting cells often produce connective tissue.

Were Mr. Clarkson's view the correct one, it would be impossible to reconcile this fact with the above-mentioned doctrine.

The author essays a description of the origin of the lymphatic vessels and glands in Chapter VIII., but is so confusing in his treatment of this interesting matter that we doubt if he clearly understands it. The remaining chapters are somewhat better than those to which we have called particular attention, but not one is wholly free from objectionable features.

Where Mr. Clarkson treads old and well-beaten paths he does fairly well, but where he attempts a little excursion into new and less familiar fields he becomes confused and wanders in an aimless fashion. We do not hesitate to say that he has failed to give us a book that we could recommend to the student, particularly the medical student. With the latter the study of histology must be considered as subsidiary to that of pathology, and, if he were to become well grounded in the principles of histology as set forth by Mr. Clarkson, he would have much to unlearn before he could appreciate the cell-changes involved in many of the morbid processes.

The illustrations, of which there are many, form the most pleasing feature of the book ; the coloring is excellent and the drawing accurate, and our chief regret in closing this review is that we cannot bestow the same praise upon the text. D. B.

VORLESUNGEN ÜBER DEN BAU DER NERVÖSEN CENTRALORGANE DES MENSCHEN UND DER THIERE. By DR LUDWIG EDINGER, Professor in Frankfurt-am-Main. Fifth enlarged edition. Leipzig: F. C. W. Vogel, 1896.

LECTURES ON THE STRUCTURE OF THE CENTRAL NERVOUS SYSTEM IN MAN, ETC. By DR. LUDWIG EDINGER.

THE fifth edition of Edinger's work is about twice the size of the fourth, and contains 113 new figures, of which 99 are devoted to the section on Comparative Anatomy. The book is divided into three parts: the first is an introduction to the anatomy of the central nervous system, the second treats of the development and comparative anatomy of the brain of the vertebrata, and the third gives us the special anatomy of the encephalon of the mammalia, dealing especially with that of man.

We find much that is new, even in those portions which are taken from the former edition. One can but admire the restless energy of the author which drives him to present to the reading public a new edition of his book every two or three years.

Edinger is still conservative in his views regarding the presence of connective tissue within the central nervous system ; the septa, however, which radiate toward the periphery of the cord consist of neuroglia.

We notice with pleasure the tribute paid to the scientific work of our countryman, Hodge.

The axis-cylinder of a nerve-fibre is supposed to be composed of

separate fibrils, and the achromatin of the cell-body is not structureless. Recent investigations have shown that it contains fine fibrils, which enter and leave the cell-body through its processes. We have here a new element to study in the morbid cellular changes. Great importance is attributed to the condition of the nucleus in degenerative processes, for restoration of the cell is possible so long as the nucleus is unaltered.

Edinger speaks of the vast number of sensory fibres which are found in all parts of the body—in the liver, kidneys, lungs, etc.—and which are necessary for the unrecognized reflexes on which life itself depends. An interesting example is given in the inability of a person to swallow after cocaine has been applied to the pharynx. Probably many motor disturbances of hysteria are due to this cause. We may refer in this connection to the experiments of Mott and Sherrington. These investigators, by cutting the posterior roots in the monkey, produced paralysis of the limbs.

The section devoted to microscopic comparative anatomy is worthy of careful study. This is a field which has not been thoroughly tilled. From the study of the lower forms much has been revealed in the higher. In many of the lower vertebrates the spinal cord is very large and is more independent of the higher centres than in man. The cranial nerves also may be enormous ; we refer to Edinger's Figure 38 as an illustration of this fact. Special portions of the central nervous system have developed to a high degree in certain animals as need has arisen, and it is precisely this fact which renders the study of the lower vertebrates valuable. Parts which are atrophied or imperfect in man are seen in great perfection in some of the lower forms, as, for example, the olfactory centres or the optic lobes. The nucleus of the vagus in the fish forms a lobe, probably because this nerve is distributed to the external surface of the body like any sensory spinal nerve. The nuclei of the trigeminus and acusticus are also of large size. The oblongata is the vital portion in the lower vertebrates, for removal of all nervous tissue anterior or posterior to this does not cause death, although destruction of the oblongata itself is fatal. The cranial nerves in the vertebrates have an astonishing regularity in the arrangement of their nuclei, but the fibres which arise from these are differently combined, and afford even yet a subject of much study for the anatomist. The vermis attains a great development in those animals which are remarkable for their powers of swimming or flying, and it is probable that the cerebellum is concerned with the preservation of equilibrium and of the muscular tonus. The histology of the cerebellum is nearly the same in all animals. The small size of this organ in creeping animals indicates that it has some connection with locomotion. The lower olives have been found only in the mammalia as distinct bodies in connection with cerebellar fibres.

The third section of the book embraces most of what has formed the bulk of former editions. Edinger tells us that the degree of development of the brain as a whole is not an index of the intelligence of the individual. A man is prominent on account of the abnormal development of some one quality, and such a peculiarity may well be associated with greater development of a corresponding portion of the brain, while the entire mass may not be greater than in less highly favored individuals. A curious observation has been made by Perls and confirmed

by Edinger. Hydrocephalus of moderate degree, which has developed early in youth and not progressed, and rhachitis seem to favor the growth of the brain by lessening the resistance. There were distinct evidences of rhachitis in Rubinstein's cranium, and Cuvier, who had a very heavy brain, had had hydrocephalus in his youth. It does not follow that all men who have become prominent on account of mental qualities have been hydrocephalic, and that hydrocephalus in every case is productive of genius.

It is well to remember the statement which Edinger repeats, namely, that irritation of any part of the cerebral cortex may cause epileptic convulsions.

The writer admits the existence of the fronto-occipital tract connecting the occipital with the frontal lobe, as described by Dejerine, Rietz, and v. Monakow. He modifies his former statements in regard to the fibres surrounding the ventricles. The callosal fibres envelop the posterior horn as the forceps major; the forceps minor is that portion of these fibres which is situated on the outer side of the inferior horn and passes to the temporal lobe. The median side of the posterior and inferior horns contains the tapetum, which is not an essential part of the callosum, but probably the caudal end of the fronto-occipital bundle. It is not impossible that callosal fibres are mingled with those of the tapetum.

Although Edinger adopts the modern view in regard to the termination of the median fillet within the thalamus, he does not make clear the relation of this to the Haubenstrahlung (tegmental radiation). In one place he says this bundle ends in the thalamus, while in another portion of the book he states, in accordance with his former teaching, that the tegmental radiation passes toward the cord.

The "silent areas" of the brain are the associative centres (Flechsig). Fibres of the corona radiata do not arise in all portions of the cerebral cortex.

Edinger still speaks of the occipito-temporo-pontine tract, although in describing the crusta he refers to the temporo-pontine tract, making no mention of its occipital origin.

Pain following apoplexy, as has been shown by the writer in two cases, may be due to irritation of the sensory tract.

More attention is paid to the cerebellar peduncles than in former editions, and we are told that the anterior peduncles are indirectly connected with the parietal lobes.

We cannot share Edinger's opinion when he says so positively that tactile fibres are not found within the posterior columns. The case of syringomyelia reported by Dercum and Spiller must be explained, if this statement of Edinger is correct. Destruction of one posterior horn throughout the cervical region with loss of thermal and partial loss of pain-sense and with preservation of tactile sense in the arm is a condition rarely seen, and one which may not be disregarded. It is well known that Charcot, Gowers, and others have located tactile fibres within the posterior columns. We turn the last page of the book with regret, looking forward with eagerness to the early appearance of a sixth edition.   W. G. S.

MANUAL OF MIDWIFERY FOR THE USE OF STUDENTS AND PRACTI-
TIONERS. By W. E. FOTHERGILL, M.A., B.S.C., M.B., C.M.   With
double colored plate and sixty-nine illustrations in the text.   Pp. 484.
New York and London: Macmillan & Co., 1896.

THIS manual is one of the productions of the Edinburgh school of
obstetrics. Its author is a prize scholar of the University of Edinburgh,
and recently House Physician to the Simpson Memorial Hospital. The
work of Hart, Webster, Murray, and Barbour has been utilized in the
preparation of this book; it is, then, a representative manual of one of
the first schools of obstetric science.

The book opens with a description of the reproductive organs and of
their functions. The development of the ovisac is given in accordance
with Foulis's teaching, which traces the origin of the *membrana granu-
losa* to the connective-tissue corpuscle of the ovarian stroma. Fertiliza-
tion is supposed to occur in both the tube and the uterus. The older
and accepted views as to the most frequent time of conception are given.
It is held that menstruation can occur only during the first two months
of pregnancy, before the fusion of the decidual membranes renders this
impossible. The diagnostic signs of pregnancy, the differences between
primigravidæ and multigravidæ, and the differential diagnosis of preg-
nancy are clearly stated, and made more impressive by tabulated com-
parison. A double-page plate of colored illustrations, showing the growth
of the early ovum, is also given. Our knowledge concerning the manner
in which the ovum obtains nourishment is summarized for the three
different periods of development through which the ovum progressively
passes. The *liquor amnii* is said to be derived from the maternal
blood through both the maternal and fœtal vessels. The spirals of the
umbilical cord are thought to be due to the tendency to spiral growth
seen in animal and vegetable organisms. Under the title of a " Simple
View of the Placenta," the after-birth and cord are held to be composed
of the same elements—bloodvessels, low connective tissue, and fœtal epi-
thelium. It is stated that the fœtal portion of the placenta is simply the
flattened and branched termination of the cord.

In treating of the fœtus attention is called to the fact that the prin-
cipal excretion of urea is performed by the placenta, which should be
recalled to mind in studying certain affections of the mother. In
twin pregnancy binovular twins result from the development of two
ova and are physiological. Each fœtus has a distinct amnion and pla-
centa, the sex of the children being usually different. Uniovular twins
are considered pathological, resulting from the development of a single
ovum, and are frequently the subject of malformation. The duration
of gestation is thought to vary with the length of the menstrual cycle,
and so great is the variation in pregnancy that it is considered useless to
spend much trouble in calculating the probable date of labor. In esti-
mating the length of the fœtus, it is thought to be practically the same
as the distance from the fundus of the uterus to the pubis. In attempt-
ing to assign a cause for the occurrence of labor recourse is had to the
principle of natural selection. Heredity has gradually brought about
the establishment of habitual gestation at ten menstrual cycles, which
thus becomes typical of the human race. The hygiene of pregnancy

is not fully considered, and no further attention is paid to the examination of the urine than to advise that it should be tested for albumin during the later months. The pathology of pregnancy is treated at length, and in the treatment of syphilis importance is ascribed to keeping the blood alkaline by giving potassium chlorate to the end of pregnancy. Nausea and vomiting of pregnancy are briefly considered, and without especial reference to the importance of displacement of the uterus or the value of dilatation of the cervix. Albuminuria is not considered the cause of eclampsia, but albuminuria results from the diseases which in some cases produce eclamptic seizures. The examination of the urine seems to have been for albumin only, without reference to the estimation of solids or urea.

Extra-uterine pregnancy is considered in accordance with the views of Webster and Hart, and treatment is limited to surgical interference. In treating of abortion the value of the tampon is recognized, and the importance of thorough emptying of the uterus is enjoined. The douche curette is mentioned only in a foot-note.

Labors are classified as "natural," "preternatural," and "complicated," a distinction which is not evident. The mechanism of labor is carefully given, the old nomenclature of four positions for each presentation being retained. Rotation of the presenting part results from the action of the posterior segment of the pelvic floor. An interesting section on the "Anatomy of Labor" embraces illustrations, from various sources, of frozen sections. The illustrations are well selected and of value. In discussing the separation of the placenta but little weight is given to the formation of a blood-clot between the placenta and the wall of the womb. The after-birth is thought to be separated by loosening of the placental site, and to be expelled from the patient's body by detrusion.

In speaking of the management of normal labor it is not considered necessary to measure the pelvis of every patient, but only those not obviously well-grown and of pelvic conformation. This seems scarcely in keeping with the thoroughness of other portions of the book. Turpentine is recommended as an antiseptic for cleaning the hands, advice which seems hardly needful in view of the success of the bichloride method or the permanganate and oxalic acid.

No preliminary douche is required for the healthy patient, but the practice of strict cleanliness is enjoined. During the second stage of labor the rupture of the membranes is justifiable to hasten birth, a recommendation which seems scarcely adapted to all cases. Posterior rotation of the occiput is best treated by maintaining flexion and allowing the labor, if possible, to terminate spontaneously. Attention is called to the fact that extending the legs relaxes the skin and fascia of the perineum, and thus tends to lessen the danger of laceration. Immediate repair of the perineum may be made while the placenta is still within the uterus, before the third stage of labor has taken place. Ergot should not be given after labor as a routine prescription. It is advised, however, where tendency to hemorrhage is present. If the conduct of labor has been clean, it is better, on the whole, to omit all douching after delivery.

It is not thought that chloroform can be proved to increase the tendency to post-partum bleeding. In giving this anæsthetic the respiration and pupils should be carefully watched. The pulse may be neglected, if this is done. After delivery the direction is to apply a warm diaper

and the binder. It is not stated that the diaper is antiseptic, and the impression is given that an antiseptic dressing over the vulva is not necessary after labor.

Under the head of "Morbid Labor" are included defective pains, abnormal conditions of the genital tract, and abnormalities in the fœtus. Contracted pelves are embraced in this section, and the value of Walcher's position is emphasized, with the use of forceps. Symphysiotomy may succeed with a conjugate of two and one-half inches. From our experience we should not like to rely upon symphysiotomy in this degree of pelvic contraction. In generally contracted pelvis the obstetrician is warned against delivery by breech presentation. Under the head of "Preternatural Labor" are included pelvic presentations, transverse presentations, and those of the hands and feet and head and foot. The exact meaning of the term "preternatural" in this connection is not apparent in this book.

Complex labor is that complicated by hemorrhage from placenta prævia, separation of the placenta, or retained and adherent placenta. Where there is little dilatation of the cervix and accidental hemorrhage is present, abdominal section is considered the only proper treatment. We presume that the author would perform hysterectomy, securing the vessels by ligature in such a case. The treatment of postpartum hemorrhage and especially the value of hot douches are clearly given. The author has not escaped the belief of his countrymen that iron may be used as a styptic within the uterus. He considers, however, such treatment to be rare. It should be entirely abandoned as irrational and dangerous. The value of saline transfusion is fully recognized.

In considering rupture of the perineum episiotomy is advised as a preventive, and suture with chromicized catgut, the stitches not passing through the skin, is thought the best method of repair.

Various forms of eclampsia are described, and toxæmia is hinted at as the cause, although this is not definitely stated. Chloroform, morphine, venesection, pilocarpin, and the steam-bath are advised. In cases commencing before labor the uterus should be emptied at once.

The term "apnœa neonatorum" replaces asphyxia neonatorum. The reason of this variation in nomenclature is not apparent. The various methods most successfully used in this condition are given.

In dealing with obstetric operations preference is given to extraction by the forceps, and this operation is described in minute detail. Axistraction instruments only should be used. When the head is brought upon the pelvic floor it should be entirely delivered by the traction-rods, and not by relinquishing these and grasping the handles of the forceps. It is claimed that a far more successful and skilful delivery is thus effected. The forceps is indicated in flat pelves in place of version, even though the blades must be applied over the face and occiput. Walcher's position is again recommended, and wisely so, the legs of the patient being let down while the head is at the brim of the pelvis, then raised when it reaches the outlet and lowered again when the head is upon the perineum. An excellent illustration of a patient in this position, taken from a photograph, is appended. Delivery by forceps is illustrated with the patient in the lateral position, although it is stated that the lithotomy position has many advantages. Symphysiotomy is briefly mentioned, and its range is stated as probably in pelves with true conjugate between two and one-half and three and one-quarter inches. We doubt its value

below eight cm., or three and one-eighth inches, in true conjugate. The after-treatment of symphysiotomy is dismissed with a couple of sentences. In treating of induced labor the operation should be rapidly completed by the use of Barnes's and de Ribes's bags. If necessary, Hegar's dilators should begin the labor. The child should be incubated.

In treating of the Cæsarean operation Sänger's is preferred. The author evidently is not familiar with the intrapelvic treatment of the stump after hysterectomy for impossible labor, for he writes that a great advance will have been made if it is found, after a sufficient number of experiments, that the stump may safely be dropped back into the peritoneal cavity as after ordinary abdominal hysterectomy.

In treating of the puerperal state no mention is made of antiseptic precautions in the care of the breasts. The nipples must be kept dry when not in use, but the necessity for avoiding septic infection is not made apparent. The patient may leave her bed in ten days and lie upon a couch, and the use of antiseptic douches may be permitted if the nurse secures perfect cleanliness of instruments and vessels.

Puerperal septicæmia is briefly considered, and we are surprised to notice that details of treatment for this affection are considered of so little importance that they are printed in foot-notes. It is considered dangerous to scrape the endometrium and apply strong solutions of phenol or corrosive sublimate, and total hysterectomy is given as a course which is now securing favorable results. It is certainly true that scraping the interior of the puerperal uterus and applying strong antiseptics is a most dangerous practice, but there are other and better methods of cleansing the cavity of the uterus which render hysterectomy advisable in rare cases only.

The care of the infant is concisely stated, but infant-feeding is very imperfectly described, and it is stated that milk may be exposed to a high temperature from thirty to forty minutes to advantage. The value of Pasteurization does not seem to be appreciated by the author.

This manual, however, is well worthy of the brilliant school of obstetrics whose teaching it embodies. In many respects it is a most admirable book, containing a great amount of modern scientific information, clearly, concisely, and logically stated. While we may differ with the author in some points, we have enjoyed and admired his manual and can heartily commend it to others.　　　　　　　　E. P. D.

Short Contributions to Aural Surgery. By Sir William B. Dalby, F.R.C.S., M.B. (Cantab.), Consulting Aural Surgeon to St. George's Hospital, London. Third edition. London: J. & A. Churchill, 1896.

This brochure consists of articles on various otological subjects that have appeared in the *Lancet* and *British Medical Journal* between 1875 and 1896. All are good; all are very conservative. It will repay any physician, whether interested in a general or special practice, to read these nineteen essays, as they are clearly written and entirely free from technical wording. We cannot single out any one or two articles as especially good, for fear of detracting from others. We can advise most heartily a careful reading of them all. The entire set are embraced in 140 well-leaded, large-typed octavo pages.　　　　C. H. B.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

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SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

Intestinal Antisepsis.—DR. HEINRICH STEIN closes a scholarly paper with
an enumeration of the various agents by which intestinal antisepsis can be
obtained. The first remedy for evacuating the intestinal contents to be men-
tioned is calomel, which is, by interaction with sodium chloride, converted
into corrosive sublimate. For this purpose small and repeatedly frequent
doses are recommended. In abnormal acidity precipitated calcium carbonate
(one grain for a dose, two and one-half drachms per day) or magnesia (ninety
grains per day) has an antiseptic action. Creosote, one or two drops several
times daily; guaiacol, one and one-half grains for a dose; and resorcin in 5
per cent. solution in water or brandy, forty-five[?] grains daily, are useful.
These are only slightly absorbed, and in that respect their action is shorter;
but, on the other hand, they may act after absorption on distant areas, so
that both facts should be borne in mind in prescribing. Valuable antisep-
tics are menthol (one and one-half grains twice or thrice daily); naphtalin
(one and one-half to seven and one-half grains for a dose; seventy-five grains
per day); and, finally, thymol (one and one-half grains several times daily in
alcoholic solution); the last is an excellent antiparasitic (anchylostomum).
Since absorption limits the action of the drug in the intestine, various
antiseptics have been prescribed with insoluble substances; salol (to two
drachms per day); parachlorsalol, kresolsalol, beta-naphtolsalol or betol
(the last slightly poisonous). These are broken up in the intestine, partly
by the pancreatic juice and partly by the unformed intestinal ferments,
into salicylic acid and kresol or naphtol. Harmless and otherwise proper
substances to be used for similar purposes are benzonaphtol, ammonium
sulpho-ichthyolate (to thirty grains daily), and salophen (to two drachms per
day); also the esters of guaiacol. These last are first decomposed in the
intestine and may give rise to a successive antiseptic action. Guaiacol ben-
zoate—salicylate, cinnamate, carbonate (one to two grains for a dose, several
times repeated). The absolutely insoluble antimicrobic remedies can be

given in much larger doses; such are phenol-bismuth (fifteen to forty-five grains per day for this and the rest); kresol-bismuth, chlorophenol-bismuth, bismuth salicylate, zinc salicylate, and trioxymethylen (paraformaldehyd). Doubtless the most effective treatment of affections of the large intestine, especially of the bacterial, is by way of the rectum. Naturally the possibility of ulceration of the intestinal wall must be considered. For irrigation, solutions in sterilized water of salicylic acid (one to two parts *per mille*); silver nitrate (0.2 to 0.5 *per mille*); boric acid (0.5 per cent.); creolin (0.01 to 0.02 per cent.); and tannin (2 to 5 per cent.) may be used. Applications of an insoluble antiseptic powder, as the various bismuth-preparations, may be used during the irrigations. The results of antiseptic intestinal medication are satisfactory, but on account of the difficulties not altogether thorough. These, however, are common to all internal antiseptics.—*Centralblatt für die Gesammte Therapie*, 1896, Heft vi. S. 321.

A Case of Electric Shock.—Dr. John T. Gilbride reports an instance of recovery from a shock of two thousand volts. Twenty minutes after the accident the patient was unconscious, suffering from cerebrospinal convulsions, with legs and arms flexed, considerable jactitation, reflexes markedly increased, skin warm and dry, breathing accelerated, pulse one hundred and forty per minute, and pupils normal. Twenty grains of chloral were given by the mouth and repeated every ten minutes with but little effect until sixty grains had been taken. The convulsions almost disappeared, and he rested more quietly. One fluidounce of whiskey was now given as a heart-stimulant. The axillary temperature was 97.4° F., the respiration 20, and the pulse 100 per minute, full and strong. After twenty minutes he showed considerable violence and had a number of convulsions. After twenty grains of chloral he rested quietly and was in good condition, regaining consciousness five hours later. He now complained of being weak, of hoarseness and stiffness of the muscles, and of considerable headache. He had no recollection of occurrences for six hours before the accident. There was no vomiting nor involuntary discharges, and the only lesions were a burn of the third degree from contact with the wire and two abrasions of the scalp.—*University Medical Magazine*, 1896, No. 9, p. 724.

The Treatment of Syphilis and Gonorrhœa.—Dr. J. F. Larrien presents the second edition of his pamphlet of forty-three pages. He uses Vienna paste for the initial lesion and makes daily mercurial inunctions over the enlarged glands. For internal medication three to five drops of tincture of iodine in a half-glass of sweetened water are given each morning for twenty days while fasting. After ten days of rest this course may be repeated. For the secondary manifestations: (1) Each morning the patient receives fifteen minutes before breakfast in pure or sweetened water three drops of tincture of iodine and a half-ounce of a solution of crystallized sodium iodide in distilled water (one to fifteen), and this is to be continued during five to eight months from fifteen to twenty days each month, the remaining days being free from medication. The treatment is to be discontinued only when two months have elapsed since the appearance of all secondary manifestations. In severe cases it will be well to prescribe a

new series of three or four courses of iodine for from two to six months after the first. (2) Each day gentle inunction is made on the cutaneous syphilides with a 10 per cent. solution of white precipitate in starch glycerite. (3) For *plaques muqueuses* of the bucco-pharynx gargles of zinc chloride in water (one to five hundred) are used; or cauterization may be effected by silver nitrate or acid mecuric nitrate. In place of these may be used a gargle five to eight times daily of equal parts of hot water containing resorcin, 4 to 8 ; and glycerin, 50, in distilled water, 200. Of course, the usual hygienic rules must be followed.

The author also presents a method of treating gonorrhœa. At the out-set there should be the ordinarily enforced avoidance of stimulating foods and beverages, replacing alcoholic drinks with Vichy, Selters, or pure water, with possible addition of a very small quantity of wine. Injections are ordered, warm, of glycerin which has been saturated when hot with boric acid (about 20 per cent.), with addition of cocaine hydrochlorate, morphine hydrochlorate, or laudanum, if there is pain, in the proportion of 0.5 to 2, 1 to 3, or 2 to 5 (according to the substance employed) to 200 parts of the vehicle. The best substance for relieving pain and reducing congestion is the cocaine. The injections are made after urination, from two to five times daily. Patients of the herpetic diathesis and those suffering from rebellious digestive disturbances receive respectively five drops of Fowler's solution every morning while fasting and five grains of salol in capsules or in hot soup at the two principal meals. During the acute stage these injections are continued, and in addition six capsules of eucalyptol or turpentine are given with each meal. During the decline of the disease the foregoing treatment is continued, and in addition Fowler's solution is added if there is tendency to chronicity or exacerbations.—Paris, 1896.

Vegetable Dyspepsia.—Dr. W. A. WALKER notes that vegetable foods have a tendency to fermentation when the salivary ferments are deficient in quality or quantity, and this gives rise to flatulence, heartburn, eructations, and other disagreeable symptoms, to say nothing of resultant irritations which lead to permanent impairment of the mucous coats of the stomach and intestine. This condition—dyspepsia—leads to a state of mental depression highly favorable to the production of various forms of neurotic disease. For this indigestion we have an infallible remedy in diastase. This has not been received with deserved favor, because of the prevalence of the theory, now controverted by facts, that this is destroyed soon after reaching the stomach. At least thirty minutes after the completion of the ordinary meal elapse before gastric acidity reaches such a point that diastatic digestion ceases. Bread, oatmeal, or mush can be made more digestible by the addition of about five grains of diastase to the pound of food. Since the salivary and pancreatic fluids are deficient in children, we have a valuable remedy for them in diastase. Because this drug digests starches it is a fat-producer. The malt-extracts supply only a limited and uncertain amount of diastase, hence we must look to the new isolated diastase known as taka-diastase to meet this indication. For amylaceous dyspepsia the following rules should be observed : (1) Omit from the dietary, so far as practicable, pastry, condiments, syrups, and sugars. (2) Chew the food, especially bread and vegetables, slowly and thoroughly.

(3) Take two and one-half grains of taka-diastase immediately after eating. (4) Avoid any habit which causes the saliva to be expectorated instead of swallowed for at least one hour after eating. (8) Correct any temporary excess of acidity in the stomach by a dose of sodium bicarbonate.—*Therapeutic Gazette*, 1896, No. 9, p. 593.

[Of quite as much importance is the formation of the habit of masticating starchy foods in as dry a condition as is possible. The sensation of thirst can be obviated by taking a pint of hot water one hour before the meal.— R. W. W.]

The Treatment of Tuberculous Peritonitis.—Dr. Thomas believes that the fibrous and ulcerative forms of this disease do not yield to operative measures. In young subjects a good diet aided by tonics, mild and repeated counter-irritation over the abdomen, and a coating of iodoform-collodion may result in cure. In three reported cases he obtained complete cures through the use of a creosote clyster. Seven drops of this drug, increased to double the amount, are administered in five ounces of cod-liver oil. In addition, applications of ichthyol may be used. The conclusion is suggested that this treatment will yield good results when operation is not indicated nor possible.—*Journal des Praticiens*, 1896, No. 36, p. 565.

Thyroidine.—Dr. R. Lépine states that this substance can be obtained : (1) by digesting the gland with an artificial gastric juice ; or (2) by extracting with alcohol and a mixture of water and glycerin ; or (3)—and this is the best —by extracting with a $7\frac{1}{2}$ per cent. salt-solution through which carbon dioxide is passed, and after acidifying subjecting the resultant to boiling. The recent indications for the use of this remedy are based upon its marked inhibitory action upon utero-ovarian activity and its excitant action upon the mammary glands. Thus if a nursing-woman finds that her menstruation reappears and her milk becomes impoverished the administration of this substance will meet both indications.—*La Semaine Médicale*, 1896, No. 42, p. 333.

The Treatment of Itching by Large Doses of Calcium Chloride.—Dr. Thomas D. Savill administers this drug in doses of not less than twenty grains three times daily, which should be increased even to double this amount. It should be given after meals in a wineglassful of water. Should it cause thirst, and to cover the salty taste, one drachm of tincture of orange-peel and one ounce of chloroform-water, which make it really agreeable, can be added. It is not possible, as yet, to indicate precisely which cases are most suitable for this treatment, but it is worth while trying in all instances where itching is a troublesome feature. No absolute failures have been met with, although sometimes the dose has to be considerable and continued for several weeks, especially in long-standing cases.—*British Medical Journal*, 1896, No. 1864, p. 732.

The Action of Ozone on Nutrition.—MM. Butte and Peyron have found from their experiments on animals that the inhalation of ozonized air determines an increase in the amount of elimination of total nitrogen, urea, and phosphoric acid.—*La Semaine Médicale*, 1896, No. 42, p. 338.

The Treatment of Inoperable Local Tuberculosis.—M. Carömilas has used with complete success for a patient suffering from osteitis of the pubis with double suppuration, salpingitis, and incipient pulmonary disease, all tuberculous, an injection into the foci of suppuration composed of camphor, 5; resorcin, 4; olive oil, 10; carbon disulphide, 12. This is useful in the majority of instances of inoperable local tuberculosis.—*La Presse Médicale*, 1896, No. 77, p. 488.

Anuria Cured by Vesical Injections.—Dr. Albespy reports a single instance of complete anuria of four days' duration apparently due to complete spasm of the entire urinary tract. A decoction of belladonna-leaves, 10 to 500, with 10 parts of boric acid, was injected through a metallic catheter, thus hoping to relieve the spasm of the unstriped muscle of the bladder by the well-known dilating action of belladonna when absorbed by the vesical mucous membrane. Of this injection about two ounces were left in the bladder. As a result more than ten ounces of urine were obtained, and a repetition of the injection was followed by a copious flow of urine. It is evident from this recital that there are a certain number of instances in which the anuria is due to a spasm of the tissues produced through the motor nerves, proceeding from the solar plexus. In these instances the action of belladonna will serve as a touchstone when there are difficulties in diagnosis.—*Bulletin Général de Thérapeutique*, 1896, 5e liv. p. 225.

The Action of Benzacetin in Neuralgia.—Dr. A. Reiss has made use of the following mixture: benzacetin, 85.8; caffein, 8.5; and citric acid, 5.7 per cent., in his practice at the Insane Asylum at Stephansfeld. In old cases of habitual headaches, neuralgia, and migraine the action was satisfactory. Improvement followed in from one-quarter to three hours and persisted from one to two days. Unpleasant circulatory and digestive symptoms were observed in only two instances. The usual dose was eighteen grains. If one dose was not sufficient, the second was given in from one-half to one hour. Of sixty-one patients eighteen were completely cured, twenty improved, with questionable results in five, and none in eighteen.—*Therapeutische Monatshefte*, 1896, Heft 6, S. 319.

[Benzacetin is said to be acetamido-methyl-salicylic acid, which is soluble in alcohol and slightly in water.—R. W. W.]

The Treatment of Erysipelas with Vaseline.—Dr. H. Köster states that this consists in painting the parts affected twice daily, covering the application with linen and fastening with a gauze bandage. Beyond this the treatment is purely symptomatic; for headache, acetanilid or antipyrin; if the temperature is over 104° F., quinine in seven-grain doses; if cerebral symptoms, ice-bag to the head, a cathartic, as calomel or senna; for delirium, chloral; for heart-weakness, digitalis and alcohol. The advantages of this method are obvious. The one hundred and thirty patients show that the results are equally as good as with other methods. (1) The duration of the fever is the same as with lead-lotion, painting with iodine, ichthyol-vaselin, or sublimate-lanolin. (2) This treatment results in extension of the process as frequently as do the others, for none is exempt. (3) Complications,

especially of phlegmonous processes, are not more frequent than under other methods. (4) This method is equally efficient, and presents no danger of exciting untoward symptoms, as burning, odor, or poisoning, and the additional advantage that it is inexpensive.—*Therapeutische Monatshefte*, 1896, Heft 6, S. 299.

Uranium Nitrate.—Dr. Samuel West reports that, when administered in the treatment of diabetes mellitus, this drug diminishes thirst, reduces the amount of urine which is passed, and reduces the percentage of sugar. Ten grains can be administered three times daily without inconvenience as far as concerns digestion. He concludes that it is a drug of considerable value, though, like other drugs, it cannot be relied upon to produce equally good results in all cases indiscriminately.—*Medical Press and Circular*, 1896, No. 2989, p. 127.

The Treatment of Incontinence of Urine by Suggestion.—Dr. A. Cullerre has treated twenty-four patients, infants and children, during the past four years. Of these hypnotic suggestion has cured twenty, benefited two, and in two instances only has there been failure to obtain permanent relief. The degree of hypnotism is not of great importance. The formula of suggestion varies according to the case : not to wet the bed ; to awaken the moment the desire is felt ; to awaken at a given hour to urinate ; to think while sleeping that it is not necessary to wet the bed. If necessary, there can be provoked an insomnia intended to accustom the brain to perceive the need of urination. Soon this insomnia disappears of itself, and the patient, accustomed to watch his bladder, does it even although sleeping. Generally the cure is immediate ; sometimes it is delayed for several weeks. The age of the patients treated was from six to twenty-three years ; the method is applicable above the age of three years. The author believes that essential incontinence of urine in infants and adolescents is a neuropathic stigma, in general benign, but sometimes a forerunner of more or less grave nervous affections, as neurasthenia, hysteria, hypochondriasis, mental obsessions, being founded upon preoccupation or fixed ideas relative to the urinary function. The patients come from families in which the neuropathic stigmata are of different forms, not necessarily mental alienation, properly speaking, but often signs of physical and moral degeneration. Incontinence is transmissible by similar heredity ; it may even become a family disease.—*Archives de Neurologie*, 1896, No. 7, p. 1.

Creosote Valerianate.—Dr. E. Grawitz uses this remedy in gelatin capsules, which conceal the taste and odor of the drug. In each capsule three drops are placed, and one of these is given thrice daily with milk. The dose can be increased to thirty drops daily. The results of its use with thirty-five tuberculous patients shows that it is an advantageous method of prescribing creosote.—*Therapeutische Monatshefte*, 1896, Heft 7, S. 384.

The Influence of Somatose upon the Milk of Nursing-women.—Dr. Richard Drews states that this food exercises a specific action upon the mammary glands of nursing-women in that it produces an abundant

secretion of milk and rapidly removes the disorders observed during lactation. It is, therefore, recommended when the quantity is insufficient and when at the commencement of lactation the flow seems about to cease, in order that the dangers of artificial alimentation may be avoided. It goes without saying that the integrity of the gland is perfect and there are present no diseases which prevent nursing. The dose is three or four teaspoonfuls daily taken in milk, hot bouillon, or cocoa. It has hardly any taste, and therefore is easily administered and its use continued for a long time.—*Revue de Thérapeutique Médico-Chirurgicale*, 1896, No. 13, p. 392.

The Treatment of Whooping-cough.—DR. FERREIRA reports twelve instances of the use of bromoform, and concludes that (1) in case of failure of topical applications or when they are not possible we must resort to general therapeutic measures. (2) The preparations of belladonna in intensive doses, and especially of atropine, exercise a real influence upon the cough. The difficulty of managing the remedies and their incontestable dangers prevent their popular use. (3) Bromoform, if it does not surpass, can be placed equal with belladonna and atropine for this purpose. It acts promptly and diminishes the attacks and produces amelioration and indeed cure when used with energy and in accord with the severity of the disease. (4) The drug is of easy administration in infancy, and children bear the remedy remarkably well. (5) Through its double action (sedative and antiseptic) it fulfils two indications in combating the spasmodic element and attacking the germs causing the disease. (6) It should be used *larga manu* in view of the excellent results obtained. The drug is given in solution, with sufficient alcohol for dissolving it, in dose of from three to six drops daily for children under one year, and six to fifteen drops for larger children.—*Bulletin Général de Thérapeutique*, 1896, 12e liv., p. 529.

The Preparations of Strophanthus.—DRS. HORATIO C. WOOD and WILLIAM S. CARTER have made a laboratory study of both an extract of the drug as well as of strophanthin. They found that the extract was an active preparation, having but little action upon the vasomotor centres, as compared with what it has upon the heart and vessel-walls. Experiments with commercial strophanthin showed that this also is an active substance, more markedly raising the arterial pressure than did the extract, thus confirming the conclusion of Rothziegel and Koralzewski that the former is a superior preparation of the drug.—*American Journal of Pharmacy*, 1896, No. 7, p. 353.

Senecio (Groundsel).—DRS. DALCHÉ and HEIM report their clinical observations upon the use of a dry extract of Senecio vulgaris in pill-form, six grains each, to the number of eight or ten daily. It seems to calm menstrual pain so long as the genital organs are healthy; but when there is uterine or periuterine disease it is without effect. This limits its employment to such conditions as the dysmenorrhœa of chloro-anæmics, of nervous hysterics or neurasthenics, of young girls, whose menstrual pains of long duration appear to be due to painful or defective ovulation. Beyond its influence upon pain it is an open question whether it affects the appearance of menstruation, favoring the establishment of the menstrual flow. It fails

in the presence of various uterine and periuterine difficulties as well as in the painful symptoms of the intermenstrual period.—*Les Nouveaux Remèdes*, 1896, No. 14, p. 409.

The Treatment of Dog-bites.—DR. J. C. VAUGHAN recommends the immediate treatment with strong fuming nitric or hydrochloric acid. One or two drops will suffice, and the slough soon separates leaving a clean wound, which heals readily. The silver nitrate stick is objectionable in that when pushed into the wound it practically repeats the bite, driving the deeper-lying saliva deeper into the tissues and further outside, and hence better protected by the albumin coagulum-film formed in the wound by this treatment.—*Indian Medical Gazette*, 1896, No. 8, p. 273.

Morphine Chloride in Poisoning by Potassium Cyanide.—DR. L. HEIM, in his experiments upon mice, found that subcutaneous injections of morphine chloride after fatal doses of potassium cyanide saved six out of ten experimented upon. The explanation is probably that in the presence of the iron in the alkaline blood these two substances are, by chemical interchange, transformed into oxydimorphine and Berlin-blue, both of which are relatively non-poisonous.—*Münchener medicinische Wochenschrift*, 1896, No. 37, S. 861.

The Contraindications to the Bromides.—DR. S. STERLING sounds a note of warning to the indiscriminate and prolonged use of the bromides by anæmic individuals. So also in respiratory catarrhs, which they are likely to aggravate, caution should be exercised. In gastric and intestinal diseases the loss of appetite, burning or pressure in the stomach, nausea, vomiting, and diarrhœa are symptoms, caused by large doses, which should not be ignored. When cutaneous irritation or hyperæsthesia is present the irritant effects of the bromides may contraindicate their use. A consideration of these facts should lead to more care in the prescribing of these salts.—*Therapeutische Monatshefte*, 1896, Heft 9, S. 500.

Absolute Alcohol as Disinfectant for Instruments.—DR. ROBERT L. RANDOLPH, after laboratory experimentation, has reached the following conclusions : (1) that in a great number of eye-instruments by far the majority are infected by exposure to the air ; (2) that absolute alcohol would seem to be a valuable disinfectant for instruments infected under the conditions which ordinarily surround us in everyday life ; (3) that the septic character of instruments infected with a pure culture of staphylococcus albus is not altered by exposure for twenty minutes to the action of absolute alcohol. The alcohol used is supposed to have a strength varying from $98\frac{1}{4}$ to $99\frac{9}{10}$ per cent.—*Johns Hopkins Hospital Bulletin*, 1896, Nos. 66 and 67, p. 185.

The " Disintoxication " of the Blood in Cerebral Rheumatism.—DR. H. BARRÉ reports a single instance in which in spite of repeated cold baths and sodium salicylate the temperature rapidly rose. The method is as follows : first, the needle through which the artificial serum is to be passed is introduced into the right median cephalic vein. As the transfusion is

beginning to be made, another needle, through which the blood is to be withdrawn, is introduced into the corresponding vein of the other arm. Improvement showed itself when about six ounces of blood, which had been replaced by the artificial serum, had been withdrawn. Twenty ounces in all were withdrawn. The patient recovered. The essential peculiarity of the process consists in the simultaneous drawing of blood and introduction of artificial serum in quantity not greater than that of the blood withdrawn.— *Medical Press and Circular*, 1896, No. 10, p. 230.

The Treatment of Rheumatism by Local Application of Methyl Salicylate.—MM. LANNOIS and LINOSSIER have found that this method will advantageously replace the use of salicylates when given by the mouth, but should only be thus used when they are impossible to be administered, the reason being the difficulty of applying the drug to very painful joints. In the subacute and chronic forms it is useful, and its absorption is equally certain.— *La Semaine Médicale*, 1896, No. 42, p. 388.

The Treatment of Cardiac Failure.—DR. T. GRAINGER STEWART believes that the most important agent is rest, next the element of hope, and finally diet. Here excess of fluids is to be guarded against. Alcohol as an article of diet must not be used, even to habitual slight excess, nor in any form which gives rise to dyspepsia. Massage in the great majority of cases of cardiac dilatation diminishes the area of cardiac dulness. The character of the cardiac sounds and the rhythm and strength of the pulse correspondingly improve, the patients usually experience a sensation of comfort and feel the better for the treatment, although rarely the opposite effect may be produced. Although the immediate effects pass off in a few hours, they frequently do not pass off completely. Repeated applications bring about a permanent diminution of the area of dulness, with improvement of the pulse and patient's sensations, although the effect rarely may be deleterious. Movements with limited resistance show in a large proportion of cases immediate improvement in the condition of the heart, as shown by percussion and auscultation, the sounds becoming more distinct and the area of dulness diminishing to a greater or less extent. In many cases the rhythm of the pulse improves and the heart becomes more vigorous. While the immediate effect is in so far temporary, the heart rarely goes back to its previous condition of dilatation, but remains somewhat smaller than it was before the exercises, and gradual improvement of a lasting kind sets in, so that the heart recovers its tone and the area of dulness diminishes. The saline bath (five pounds of sodium chloride with eight ounces of calcium chloride in a forty-gallon bath), in which carbon dioxide in large quantities is liberated, produces a most striking diminution of the area of cardiac dulness, with slowing and strengthening of the pulse, changes just as definite as those produced by the exercises above mentioned.—*British Medical Journal*, 1896, No. 1864, p. 701.

A Modified Method of Administering Oxygen and Ether.—DR. H. A. HARE states that when oxygen is given with ether vomiting is less frequently met with, excessive pallor is rarely seen, and post-operative

depression seems to be largely avoided. The apparatus which he suggests consists of a somewhat funnel-shaped piece of leather having a greater diameter in one direction than in another, into which is fitted a piece of soft felt or spongiopiline almost a quarter of an inch thick. In the under surface of the leather cone is inserted a small metal tube, and at the opening of this tube a small hole is cut in the spongiopiline. The ether is poured upon the spongiopiline in the cone, in the apex of which is placed some absorbent cotton. The oxygen enters the cone by means of a rubber tube attached to the above-mentioned metal entrance. With this apparatus (1) the supply of oxygen can be delivered in varying quantities without altering the amount of the anæsthetic; (2) any quantity of anæsthetic can be employed without necessarily increasing the oxygen; (3) the leather cone prevents the rapid evaporation of the ether; (4) the spongiopiline will retain a larger quantity of ether than an ordinary towel; (5) chloroform can be substituted for ether by removing a metal cap which can be placed on the apex of the cone, thus permitting fresh air to be inhaled with the anæsthetic in such quantities as may be desired.— *Therapeutic Gazette*, 1896, No. 6, p. 445.

Local Cocaine-anæsthesia.—DOTT. TITO COSTA calls attention to the fact that when the injections are made with the solution at a temperature of 122° F. to 131° F. the following advantages are presented: (1) weak solutions (0.5 to 0.4 per cent.) possess a marked anæsthetic power; (2) local anæsthesia appears immediately after injection; (3) with an equal quantity of solution injected there is obtained a greater zone of anæsthetized tissue; (4) with an equal amount of cocaine more than double the amount of tissue can be anæsthetized by this method, and since the percentage of drug is lessened the toxic effects are markedly diminished. The elevated temperature is an obstacle to the absorption of the drug, thus making the injected solution more diffusible in the meshwork of the tissues and therefore increasing the anæsthetic zone.— *Vratch*, 1896, No. 26, p. 737.

A New Stain for the Gonococcus.—A new combination of aniline colors is proposed by PICK and JACOBSOHN as a bacterial stain very well adapted to the gonococcus (*Berliner klinische Wochenschrift*, 1896, No. 36, 811). It consists of 20 c.cm. of distilled water to which 15 drops of carbolic fuchsin and 8 drops of a saturated alcoholic solution of methylene-blue have been added. Cover-glass preparations are dried and fixed in the usual way, and are immersed in the stain for from eight to ten seconds. They are then washed in water, are again dried, and mounted in balsam.

When stained by this method the cells of gonorrhœal pus have a faint reddish color, forming a good contrast-background for the intensely blue gonococci.

[As the result of a few tests of this stain it would appear that the best results are obtained when the stain is allowed somewhat longer action than the eight or ten seconds mentioned by Pick and Jacobsohn, but from one to two minutes is amply sufficient, and the preparations are then very handsome. It is not claimed that this is a selective stain for the gonococcus alone; simply that it is well adapted to the morphological detection of that germ.]

Anæsthesia.—The semi-centennial of the first public demonstration of the anæsthetic properties of ether by DR. WILLIAM THOMAS GREEN MORTON, its discoverer, has been the occasion for the presentation of a considerable number of valuable papers.

DR. FREDERIC W. HEWITT believes that it is somewhat unlikely that an anæsthetic will be found which would possess the simplicity, the agreeableness, and the potency which characterize the administration of chloroform, the safety which distinguishes ether, and the freedom from after-effects which is such an advantage in the case of nitrous oxide. Putting on one side the possibility of the discovery of some new anæsthetic or analgesic agent, there is every reason to believe that our present systems and methods are capable of considerable development and improvement. Numerous possibilities suggest themselves. A far wider range of utility may be in store for certain drugs which are known to have anæsthetic properties, but which, for some reason or other, have not come into favor. Novel successions or combinations of anæsthetics are very likely to be worked out and to prove useful. Chloroform-anæsthesia may yet be rendered as safe as that of ether. The anæsthesia of nitrous oxide in presence of oxygen may have a great future before it. Our knowledge as to the best lines of treatment for different types or subjects is rapidly on the increase. And, lastly, let us hope that we may discover means for preventing or minimizing the after-effects of ether and chloroform.—*The Practitioner*, 1896, No. 340, p. 347.

MR. GEORGE ROWELL sums up our present knowledge by stating that chloroform is a dangerous drug because of its deleterious effect upon the heart. By avoidance of air-limitation, and by carefully watching the various symptoms displayed by the patient, an overdose of chloroform should never occur. This being avoided, the risks during chloroform administration are mainly associated with imperfect degrees of anæsthesia, and the great risk of danger lies in the occurrence of asphyxia, however produced. Although with experience and care the number of chloroform-deaths is capable of considerable reduction, yet chloroform is not, in spite of its advantages, the most desirable drug for routine use in producing anæsthesia. Still, it is of great value in cases in which, from some diseased condition of the patient, or from the particular requirements of the surgeon, ether and mixtures are contraindicated ; and this, beyond doubt, is its true sphere of usefulness.—*Ibidem*, p. 357.

MR. F. WOODHOUSE BRAINE, from thirty years' experience in the administration of anæsthetics, has arrived at the conclusion that ether should rank *facile princeps* among anæsthetics, and were he limited to the employment of only one anæsthetic agent out of the number that have at various times been brought forward, he would without hesitation give the preference to ether.—*Ibidem*, p. 365.

MR. GEORGE H. BAILEY believes the cases in which ether should not be used are those in which its administration cannot be kept up, as in and about the mouth. There is no distinction in perfect anæsthetic effect between ether and chloroform, and the former, given as it should be, can be used in the same cases as chloroform. In the very young and very old ether is preferred. Most certainly the young die under chloroform, and the stimulation of ether is good for the old. Neither is used in organic disease, but then neither do

we operate under such conditions. It seems that in this fiftieth year of the use of ether it is in far greater and increasing favor than some years ago. —*Ibidem*, p. 369.

Mr. Marmaduke Shield pleads for better instruction in the administration of anæsthetics, and cites as remedies for the prevailing haphazard methods of practice that instruction in anæsthetics should be made compulsory and that an examination in this subject is desirable.—*Ibidem*, p. 387.

The Treatment of Graves's Disease.—Dr. W. H. Thomson, believing that this has its origin from gastro-intestinal ptomaïne-poisoning, regards diet as of great importance ; meat is as poisonous in this as saccharine food in diabetes. It is an absolute necessity that a milk-diet be kept up for two years if the patients expect to get well. It is doubtful whether the majority of adults can digest fresh milk in any quantity continuously, unless the stomach is spared the task of the initial curdling of the milk with its own juices, which is a necessary preliminary to its final digestion. The experience of the peoples whose only staple is milk seems to show that milk should be fermented before using it. If matzoon is not procurable, a domestic article can be made as follows : half an ordinary yeast-cake is broken up in a pint of slightly warmed milk, which is then put aside in the kitchen for twelve hours until it has begun to curdle. One-fourth of this fermented milk is now stirred into three times this quantity of warmed fresh milk and set aside, as before, when, in summer, at least, it will be fermented in twelve hours, and could then be used but for the bitter taste of the yeast still perceptible in it. A third specimen, made in the same proportion, from the second, will generally have only the slightly acid flavor of good matzoon. After this all that is needed is to keep enough matzoon from each day's making to ferment the next day's supply. When it is thus curdled it should be well stirred and put in a refrigerator to prevent its becoming too sour. It is well not to have it too cold when used, and it should be smooth like cream and eaten with a spoon, as is soup, rather than drunk. A moderate amount of fish, and not more than one egg daily, can be taken. Bread may be used freely. Among vegetables potatoes, corn, beans, and peas are injurious if there be any tendency to diarrhœa, which necessitates the avoidance of both vegetables and fruits. Asparagus is mischievous, and often oatmeal, while tomatos in salad with lettuce generally agree. No pastry nor cakes, excepting gingerbread, are allowed. No coffee, tea, nor cocoa should be taken, and spirits should be used only when syncopal symptoms arise. Mercurial purgation should be used systematically once each week ; a blue pill, followed by a saline, or one-third of a grain of calomel rubbed up with milk-sugar, every fifteen minutes, for six doses, and a saline administered three hours after the last dose. The chief medicinal treatment consists in the systematic and unremitting use of intestinal antiseptics. As formulas : phenol-bismuth, 10 grains, with sodium benzoate and bismuth subcarbonate, of each 5 grains, in capsules, two hours after each meal ; or salol, $2\frac{1}{2}$, ichthyol, $1\frac{1}{4}$, and sodium benzoate and bismuth salicylate, of each $7\frac{1}{2}$ grains, in capsules, two hours after each meal. These antiseptics exert a specific control over the vascular and cardiac disturbances in marked contrast to the inefficiency of cardiac sedatives, and they are apparently without any injurious effect. They affect just

as favorably other symptoms, as insomnia, tremor, and agitation. Stro-
phanthus, in doses of from 5 to 10 drops of the tincture, may be used as an
adjunct, and for nocturnal attacks of dyspnœa and palpitation 10 drops of
the tincture of belladonna may be employed. In some cases of violent
action of the heart 5 drops of tincture of aconite, night and morning,
may be prescribed. So far as operation is concerned, there is no class of
patients more unpromising for surgical interference than they are at any
period of the malady.—*New York Medical Journal*, 1886, No. 932, p. 473;
No. 933, p. 505.

MEDICINE.

UNDER THE CHARGE OF

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A Case of Carcinoma of the Thoracic Duct with Chylous Ascites.—
SCHRAMM (*Berliner klinische Wochenschrift*, October 26, 1896) reports a case
of carcinoma of the thoracic duct associated with chylous ascites. As a
cause of chylous ascites, carcinoma of the thoracic duct is extremely rare.
Leydhecker reported the only case that has appeared in the literature. The
latter, however, was able to find records of only five cases of cancer of the
thoracic duct, but in none of these instances was the disease accompanied by
chylous ascites. Schramm's case was the second that had come under his
observation. It occurred in a woman, aged fifty-three years, who came
under observation on January 2, 1896. During the summer of 1895 she
gradually grew weaker and became much emaciated. Later, gastric symp-
toms, as loss of appetite and a sense of pressure after eating, appeared. Severe
pain in the abdomen and back followed, with distention of the former, that
was first noticed on December 20, 1895. When the patient came under ob-
servation there was marked abdominal distention. Physical examination
showed that there were evidences of an exudate in the abdominal cavity.
This apparently was encysted, as the dulness was limited chiefly to the epi-
gastric, umbilical, and hypogastric regions, the lumbar region giving a
tympanitic note on percussion. There was no movable dulness, but fluctu-
ation was quite marked. A gynecological examination failed to clear
up the diagnosis of the case. On January 15th the abdomen was opened and
sixteen litres of milky, whitish-yellow fluid were removed. No definite
abdominal changes could be made out, however. Two days later the patient
died, and an autopsy was made. A hard, irregular tumor about the size of
the fist occupied the region of the head of the pancreas. Nodules were
scattered over the surface of the gall-bladder, and others were distributed

throughout the substance of the liver. The thoracic duct from the first lumbar vertebra to its termination in the left subclavian vein presented cord-like thickenings as large as one's finger. At the termination of the duct were infiltrated glands that surrounded and compressed the jugular and subclavian veins. It was impossible to determine where the primary seat of the growth was. The thoracic duct was found to be completely obliterated or thrombosed at the points where the nodules were situated. Microscopic examination of sections from the various growths showed the cells to be carcinomatous in character. Chemical and microscopic examination of the chylous fluid showed that it was of the nature of chyle, although it was not so rich in albumin and fat as normal chyle usually is. Sugar was present in very small quantity, as is usually the case in normal chyle. Owing to the obliteration of the thoracic duct at various points, and to compression of enlarged glands at its orifice, there was complete obstruction to the flow of chyle. A rupture of the duct was not to be made out at any point, and Schramm thinks that pathologic changes in the wall of the duct permitted a transudation of its contents into the peritoneal cavity. It was not possible on microscopic examination to determine definitely the primary focus, although the pancreas was considered the probable primary seat of the disease.

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Ammonia in the Gastric Juice and in the Saliva.—STICKER (*Münch. medicin. Wochenschr.*, October 20 and 27, 1896) investigates the source of the ammonia contained in the stomach-secretion. Rosenheim found ammonia present, in quantities varying from 0.1 to 0.5 per mille, in the gastric juice of healthy individuals in all stages of digestion and after the ingestion of various food-mixtures. Rosenheim's observation has been confirmed by others. As an easy method of demonstrating the presence of ammonia, Sticker recommends the following modification of Streng's test: to a drop of the gastric juice a drop of a 10 per cent. solution of NaOH is added on a porcelain plate. A drop of Nessler's reagent is placed on the plate in the immediate vicinity. The two drops are then covered by a watch-crystal. Ammonia is liberated from the drop of gastric juice and enters into combination with the Nessler's reagent, producing ammonio-mercuric iodide, which causes a yellow, yellowish-red to greenish-red cloudiness of the latter. Rosenheim found that the food contained only a very small amount of ammonia, and held that most of the latter found in the gastric juice was produced by the peptic glands. Sticker doubts this assertion, and claims that the ammonia in the gastric contents is derived from the saliva swallowed with the food, which he proceeds to prove.

By means of the test already mentioned, and by other tests as well, he demonstrated that the saliva practically always contains ammonia in varying percentages. It appears to be present in two forms; first, as a loosely combined compound in the form of ammonium carbonate; and, secondly, as ammonium chloride, which is a much more stable compound. The latter he finds constantly present, whilst the former is frequently absent. The loosely combined ammonia is often present in the saliva in anæmia and in febrile conditions, in both of which he has been able to demonstrate the presence of ammonia in the blood. According to the estimates of the various writers,

the amount of ammonia in the gastric juice ranges between 0.1 and 0.25 grm. per mille. Sticker, from a large number of analyses, finds that the ammonia in the saliva varies between 0.0476 and 0.27 per mille, and thus concludes that it is quite probable that the ammonia in the stomach-contents is derived from the saliva swallowed with the food. He administered special meals to a number of patients and then removed the gastric contents at varying intervals—immediately, one hour, and two hours afterward—and found that the meal removed immediately after being taken contained more ammonia than did those that were allowed to remain one or two hours. Sticker considers this strong evidence against the theory that the ammonia is produced by the peptic glands, in which instance one would expect the amount of ammonia to increase as digestion went on. In four cases the gastric contents were removed two hours after the meal was taken, and ammonia found to be present. It had previously been demonstrated to be present in the sputum. The stomach was then washed out with a 10 per cent. soda solution, and the wash-water last removed proved to be free from ammonia. He then waited fifteen minutes and removed the fluid that had been secreted in the meantime and tested it for ammonia, finding the latter absent. From these experiments Sticker concludes that ammonia is not normally produced in the stomach, but that it is derived from the saliva which is swallowed with the food.

Thrombosis of the Abdominal Aorta.—BELL (*British Medical Journal*, October 24, 1896) gives an account of an interesting case of a patient who was admitted to the Lowestoft Hospital under his care, suffering from total paraplegia and intense pain in the legs and lower part of the back. On the day before admission the patient, who was thirty years of age, was walking along the street when he was suddenly seized with intense pain in the back and abdomen. His legs became suddenly powerless and he fell to the ground, but he did not lose consciousness.

An examination showed absolute paralysis of both lower extremities, with anæsthesia and analgesia of both legs extending as high up as the lower third of the thigh on both sides. There was a zone of hyperæsthesia two inches in width above the anæsthetic area. Sensation above this appeared normal. Knee-jerks, plantar and cremasteric reflexes were absent. The patient was in a condition of severe shock. There were involuntary passages of urine and feces, and control of the sphincters of the bladder and bowel was completely lost. The anæsthetic area extended upward and finally reached the trunk. Paraplegia became complete, and the lower extremities were cold and quite pulseless. On the fourth day after the illness began there was commencing gangrene of the skin of the right calf and of part of the scrotum, and the patient exhaled a strong gangrenous odor. The same day the patient died in a condition of collapse. Only an incomplete autopsy was permitted. The lumbar enlargement of the cord and the cauda equina were removed, but showed no gross lesions. The abdominal aorta was found occluded by a firm white coagulum from a point one and three-quarters of an inch above its bifurcation and extending into the common iliacs on either side, one inch into the left and seven-eighths of an inch into the right. No changes in the arterial coat could be made out. Bell thinks that the

paraplegia was due to the shutting off of the blood-supply to the cord through the three lowest lumbar arteries. These arteries go to supply the lumbar enlargement of the cord, from which arise the first, second, third, and fourth sacral nerves, and the sacral plexus, from which the great and small sciatic and pudic nerves, as well as muscular branches, originate. It is quite probable that the sudden deprivation of this portion of the cord of its blood-supply was the cause of the extensive paralysis that ensued.

Erythema Exudativum Multiforme of the Buccal Mucous Membrane.— LUKASIEWICZ (*Wiener klinische Wochenschr.*, 1896, ix. 23) in November and December, 1895, observed at his Polyclinic in Innsbruck, two cases of erythema multiforme of the mouth in otherwise healthy men, and in whom the skin remained free during the whole course of the disease. The upper and lower lip, the inner surface of the cheeks, and the gums show superficial, round, or irregular areas with the loss of substance. These varied in size from a millet-seed to a pea, were of a grayish color on the surface, and bled very easily. On the soft palate there were typical vesicles and small reddish ulcerations. In two other cases, with similar lesions on the buccal mucous membrane, the affection extended to the skin and produced a typical efflorescence of erythema exudativum multiforme. Lukasiewicz thinks that the mucous membrane of the mouth may be the point of infection in such cases, if one views the disease as one of the infectious diseases which it most resembles. In cases in which the disease is limited to the buccal cavity one bases the diagnosis on the acuteness of the process, the superficial character, the peripheral spreading, and quick loss of the epithelium over the erythematous area. Pemphigus shows larger vesicles and the inflammatory process is more deeply situated and runs a more chronic course. Herpes zoster is usually one-sided and associated with severe neuralgic pain. Syphilitic papules would be distinguished by the associated infiltration.

Acute Alcoholic Intoxication in a Child, followed by Convulsions and Paralysis of Central Origin and by Multiple Neuritis.—HERTER (*New York Medical Journal*, November 7, 1896) reports a case of acute alcoholic intoxication in a child, aged three and a half years, due to drinking twelve ounces of pure whiskey. The child at once fell to the floor and became unconscious, remaining in a state of stupor which lasted for more than two months. During this time he had repeated convulsions, partly general and partly limited to the left side. A right-sided paralysis, especially marked in the arm, developed. Later, extreme contractures, particularly of the left side, appeared. There was marked atrophy of the muscles of the upper and lower extremities, with loss of faradic excitability. Dilatation of the pupils, strabismus, nystagmus, and repeated vomiting were symptoms present during the first two months. For several weeks there were evidences of consolidation of the lower lobe of the right lung, during which there was irregular fever. The child did not come under observation until three weeks after the commencement of the illness, and at first the symptoms were thought likely due to a meningitis. When it was ascertained that the child had taken a large draught of whiskey, the symptoms of neuritis, which had become very marked, were referred to this cause. Herter was led to believe that the

cerebral symptoms were also of alcoholic origin. Five months after the illness began the child appeared perfectly well, with the exception of slight stammering in speaking, so that no opportunity was given of studying the anatomical lesions.

What the cerebral lesions likely were Herter is unable to state, but refers to Berkley's experiments on rabbits in which increasing doses of alcohol were administered. All animals showed marked loss of weight, and two of them died in convulsions. Sections of the brain-cortex showed that the cell-bodies of the nerve-cells stained imperfectly. There was commencing swelling of the nucleoli, as well as swelling of the branches of certain dendrons, while in other instances the dendrites were apparently atrophic.

The cell-bodies of the vascular neuroglia-cells appeared increased in size, and their protoplasmic extensions were thick and knotty. The bloodvessels showed marked changes. In the arteries and intermediary vessels the nuclei of the endothelial cells were everywhere swollen and in places fragmented. The change in the muscular protoplasm of the vessel-walls was especially distinct, and indicated that the cells were undergoing a retrogressive change. Numerous leucocytes in various stages of degeneration were present in the perivascular spaces. The changes in the nervous structures appeared to be dependent on the vascular changes. Herter thinks that alcoholic intoxication may produce similar alterations in the cerebral cortex in man.

On the Constant Occurrence of Anchylostomum Duodenale in Negroes, without Anæmia; and on the Fauna of the Negro Intestine.—ZINN and JACOBY, in Gerhardt's clinic, have made some interesting observations on the intestinal parasites of twenty-three native African negroes, representing various parts of East and West Africa. The following parasites were found: anchylostomum duodenale, twenty-one times; trichocephalus dispar, eight times; ascaris, eight times; anguillula stercoralis, four times; tæniæ, four times; amœbæ, twice. The subjects in whom anchylostomum was not found were not examined with sufficient thoroughness to disprove the title of this article. An infection after leaving Africa could be excluded. The negroes showed no sign of the anæmia so striking as a symptom in Europeans with anchylostomiasis, so that, as the authors say, the negroes have anchylostomum, but not anchylostomiasis. The difference in the cases examined could not be explained by a small number of worms, and the authors ascribe it to a racial peculiarity, such as that shown by some races toward malaria. The necessity for prophylaxis on the part of members of the Caucasian race exposed to the parasites in Africa, or from the emigration of Africans, is obvious.—*Berliner klin. Wochenschrift*, 1896, No. 36.

A Symptom of Fecal Tumors.—R. GERSUNY (*Wiener klin. Wochenschrift*, 1896, No. 40) calls attention to a new symptom in certain cases of fecal tumor. It consists simply in the fact that if strong pressure be slowly made with the finger on the tumor, the mucous membrane of the intestine will adhere in the depression, and will separate from it when the pressure is slowly removed. It is this separation which is diagnostic. It is necessary for the production of the symptom that the mucous membrane of the intestine be dry and the fecal mass not too hard. It is especially important that

there be enough gas present in the intestine to cause separation of the intestine from the mass. These conditions can evidently rarely be prevented by other things than fecal tumor.

Some interesting illustrative cases are cited, showing the value of the symptom, and some suggestive remarks on chronic constipation are added.

The Percussion of the Spleen.—Bäumler calls attention to the advantage of determining the size of the spleen by percussion instead of palpation, as is almost universally done. He holds that an enlarged spleen can rarely be felt, even when there is no tympanites, whereas even moderate enlargement can be made out by percussion. Dulness in an oval figure, seven to eight by ten centimetres, according to him, indicates enlargement. In order to avoid the difficulty caused by the position of the thin spleen between organs of different degrees of resonance, it is important to percuss with different degrees of force in different parts. Bäumler holds that even the posterior and upper parts of the spleen can be mapped out. Usually the diagonal position of the patient is most convenient, but it is sometimes necessary to try various positions. Von Ziemssen agrees in general with the opinion of Bäumler, and, like him, urges the desirability of marking out and measuring the area of dulness.— *Wiener klin. Wochenschrift*, 1896, No. 40, p. 909.

Dyspeptic Asthma.—Boas, at the recent Naturforscher Versammlung, read a paper on this subject, concerning which there is a great difference of opinion. Boas has observed twelve cases of varying degrees of severity. In some there were diseases of the lungs or heart, in others only gastrointestinal disorders, especially atony with excess of hydrochloric acid. A satisfactory explanation of the attacks cannot be given. While French observers believe the lungs and right heart are implicated, some of the Germans hold that there is a reflex depression of the force of the left ventricle. Boas finds in some cases that the diaphragm is unduly elevated. The view of Albu that the theory of autointoxication explains the attacks is rejected by Boas on the ground of his own chemical examinations.—*Berliner klinische Wochenschrift*, 1896, No. 39.

Amœboid Cells in Ascitic Fluid.—Von Leyden and Schaudinn (*Sitzungsbericht der Kgl. Preuss. Akad. der Wissensch. zu Berlin*, 30 Juli, 1896) report the discovery of an amœboid protozoön in ascitic fluid. This was first found by Prof. Leyden in the fluid from a woman of twenty-two years, with heart-disease and ascites. In the course of numerous tappings made for the relief of the latter colorless gelatinous cells were found, often aggregated in nests. They changed their shape, threw out pseudopodial processes and withdrew them again, showing active motion at ordinary temperature (23° to 24° C.). They could also be observed to unite in peculiar meshes with nodes on the processes thrown out. These nodes were at times loosened and in turn developed into cells. About the same time similar bodies were found in the ascitic fluid of a man of sixty-three years, who had carcinoma of the stomach. In the first patient nodular masses could be felt in the abdomen after tapping, so it was assumed that she, too, had cancer. The examination of the bodies was made by Dr. Schaudinn,

assistant in the zoölogical laboratory of the University of Berlin. Dr. Schaudinn finds the cells are parasitic protozoa, the exact classification of which he does not wish to make in the present unsettled state of the subject. "They are undoubtedly amœbæ, and perhaps nearly related to the free-living placopus."

The objection has often been made that the extensive work on parasitic protozoa, as those of malaria, dysentery, etc., has all been done by pathologists, not by specialists, and for that reason is often belittled by the said specialists. It is therefore a matter of congratulation that Prof. von Leyden availed himself of an expert " who for years has been working on protozoa." Whether he is able to distinguish these from body-cells any better than a Pfeiffer, an Adamkiewicz, or a Sudakewitsch, remains to be seen.

Physiology and Pathology of the Thyroid Gland.—In an address on the above subject VICTOR HORSLEY (*British Medical Journal*, December 5, 1896) reviews very carefully the experimental work that has been done with the object in view of ascertaining what the true physiological function of the thyroid gland is. The histological structure of the thyroid and of the parathyroid is dealt with, as well as the pathological changes that occur in the gland in myxœdema and exophthalmic goitre. In summarizing our present knowledge with regard to the function of the thyroid, Horsley states that it is generally agreed that whereas myxœdema and cretinism result from simple loss of function of the gland, exophthalmic goitre in its various degrees results from a perversion of that function.

The Effect of the Weather on Hæmoptysis.—EGGER (*Correspondenzblatt für schw. Aerzte*, 1896, No. 18) investigated this subject by means of the records of the Basel policlinic in 1895, with the following results : the change from good to bad weather, especially in the transition from warm to cold or cold to warm seasons, corresponds with a change for the worse in the condition of many patients with pulmonary disease. In a large number of these cases coughing is increased, and in a small number of such persons the cough causes an increase of pressure in the pulmonary circulation and so favors hemorrhage. Changes in the weather which favor " catching cold " have similar consequences, as do epidemic bronchitis, influenza, etc.

Herpes Labialis in Tubercular Meningitis.—HABEL reports an instructive case from Eichhorst's clinic (*Deutsche med. Wochenschrift*, 1896, No. 42). The symptoms of meningitis were plain though not striking ; there was pain on pressure over the left mastoid process, without positive signs of ear-disease ; slight dulness over the apex of the left lung. Numerous herpes vesicles appeared about the mouth. Eichhorst made the diagnosis of tubercular meningitis, largely on account of the slow course and the moderate temperature. Lumbar puncture was practised, but without finding fluid. Postmortem examination showed tubercular meningitis, affecting especially the pia of the base of the brain and in the Sylvian fossæ, with dilatation of the ventricles. There was also a caseous focus in the left apex and beginning miliary tuberculosis of all the organs.

Out of sixty-five cases of tubercular meningitis treated in Eichhorst's

clinic since 1884, this is the only one with herpes, the rarity of which symptom in the disease is well known. [Nothing is said in regard to the possibility of septic infection.] The cause of the emptiness of the dural canal was not disclosed in the case reported. In twelve cases examined by puncture in the Zurich clinic tuberculosis was present in eight. Bacilli were found in seven of these. Habel calls attention to the formation of a slimy coagulum in the fluid withdrawn in the tubercular cases, but not in others. The bacilli were found in the coagula.

Changes in the Gray Matter of the Spinal Cord in Pernicious Anæmia.
—TEICHMÜLLER (*Deutsche Zeitschr. für Nervenheilkunde*, viii. H. 5 u. 6) reports a case of pernicious anæmia with arteriosclerosis, paræsthesia, chronic enteritis, and increased knee-jerk. Post mortem small hemorrhages were found in the corpora striata and corpora quadrigemina. Microscopic examination showed changes such as have been described by others in the posterior columns, and, in addition, hemorrhages in both the gray and white matter, with degeneration in the anterior and lateral columns of the cord. The author combats the view that the changes in the cord in pernicious anæmia represent combined-system disease and looks on the change in the gray matter as of chief importance.

The Diagnosis of Malignant Tumors of the Lung by the Sputum.—
BETSCHART adds another to the small number of cases in which malignant disease of the lung has been diagnosticated by the sputum-examination. The sputum in this case was of variable color, often brownish-red, as in infarct, but never resembling raspberry-jelly, as was at one time thought to be the case in such conditions. Microscopically there were free fat-globules, leucocytes, and large numbers of epithelioid cells more or less aggregated. The sputum also contained particles visible to the naked eye—in fact, up to three mm. in length, yellowish or brownish, and gelatinous-looking, which proved to be carcinomatous. The diagnosis thus made was confirmed by post-mortem examination.— *Virchow's Archiv*, Bd. 143, H. 1.

Pneumothorax following Puncture.—
A. FRAENKEL reports the following instructive case: a man, aged seventy-three years, had signs of left-sided pleural effusion with severe emphysema. Puncture was made in order to determine the presence of fluid, but with a negative result. Soon after this the patient had collapse-symptoms, with cyanosis and frequent respiration, and died in four days. During life the upper left part of the thorax in front expanded less than the right, while the lower part of the left side was retracted strongly with each inspiration. There was no succussion, no metallic percussion-note. Autopsy revealed left-sided pneumothorax. The left lung was very much retracted, the pleural cavity empty. There was no evidence of inflammation. The lungs were soft and inelastic. On blowing up the left one no perforation could be found. Fraenkel concluded that the pneumothorax was due to the puncture, and warns against its use in cases of emphysema unless the indications are clear.—*Zeitschr. für prakt. Aerzte*, 1896, Nos. 13 and 14.

SURGERY.

UNDER THE CHARGE OF

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Gastro-entero-anastomosis; Entero-anastomosis; Cholecystentero-anastomosis without Preliminary Opening of the Organs to be Anastomosed.
—Souligoux describes the following operations (*La Presse Médicale*, 1896, No. 59):

He produces on each of the two organs to be anastomosed an area of sphacelus. These two points are brought together, face to face, and retained by sutures; peritoneal adhesions form. At the end of forty-eight hours the sphacelated zones fall in, and the adhesions are more than sufficient to prevent separation of the two organs. The instruments needed are a pair of powerful forceps, a small Reverdin needle, No. 3 silk, and solid caustic potash.

Gastro-entero-anastomosis. After cœliotomy the first loop of jejunum is sought and a silk thread is passed through the mesentery, in order to draw the intestine out of the abdominal cavity. The intestine at the proper point is caught between the blades of the forceps and compressed with all the force the operator can employ. The two intestinal walls are thus made so thin that they are transparent. The same manœuvres are repeated upon the stomach. Here it is important that the assistant exposes well the fold formed on the stomach, and that he does not allow the mucosa to slip until it is secured in the grasp of the forceps.

Two fortified zones are thus determined on the two organs, the surfaces of which soon take on a black coloration. The peritoneum only has resisted the crushing effect of the forceps. The line of suture is commenced about 2 mm. from the margin of the contused area, uniting the two inner surfaces throughout their entire extent. At this moment the crushed surfaces are cauterized with caustic potash, after which the assistant sponges the area thus cauterized. The sutures are then placed in the two external borders. If any discolored area appears outside the suture, this point is inverted by additional sutures. The operation may be completed in twenty minutes. It remains only to close the abdominal cavity.

Entero-anastomosis. This is performed in the same manner as the gastro-enterostomy.

Cholecystentero-anastomosis. The author has endeavored to produce something analogous to the ampulla of Vater. In this procedure he opens neither the gall-bladder nor the intestine.

Upon the intestine he traces an elliptical incision, 2 cm. wide and 3 cm.

long, comprising only the serous and muscular coats. The flap thus made is removed. The mucosa exposed is compressed and cauterized to the extent of $\frac{1}{2}$ cm.

Upon the anterior and posterior face of the gall-bladder a small needle, carrying a fine silk thread, is passed. The posterior thread is attached to the posterior border of the intestinal wound, the summit or base of the gall-bladder is crushed and cauterized with the potash, and the anterior thread is passed through the intestine in front of the intestinal wound, the posterior thread having already been so placed. On drawing on these threads the gall-bladder is invaginated in the intestinal canal, and while retained in this position by the assistant making traction on these threads, the suture around the margin of the anastomosis is made. The two original threads are then removed. At the end of four hours the sphacelus falls in and the communication is complete.

The Objects and Limits of Operations for Cancer.—In discussing this subject CHEYNE (*British Medical Journal*, February 15, 1896) says : " The primary object of operation in cancer is, of course, the prolongation of the patient's life and the alleviation of his local trouble ; and what I propose to assert in these lectures is that these results are in the most cases best attained by aiming, whenever it is possible, at the cure of the disease. Until recently, and even now, many surgeons approach operation in these cases impressed with the view that real cure is practically hopeless, and that with few rare exceptions the most that can be expected is prolongation of life for a variable length of time. I therefore hold and would strongly urge the view that the first question to be kept before us in investigating a case of cancer is whether there is a possibility of curing the disease or not. Such a point of view makes a great difference in the operation, for it is not then sufficient to remove only the noticeable disease, but it is necessary to take away as far as possible the parts in which the disease may have become disseminated, although still unrecognizable—in other words, possibly infected lymph-areas. Hence it is necessary in all cases where the disease has lasted any time, or extended at all deeply, not only to remove the primary mass freely, but also to take away the whole lymphatic area up to and including the nearest lymphatic glands. Thus the operation performed with the object of curing the disease becomes a much more extensive one, and consequently much more serious than that which simply aims at getting rid of the main trouble for a time and prolonging the patient's life. The first question to be considered, then, with regard to a case of cancer is the anatomical one, namely, whether it is anatomically possible to remove all the local disease and the probably infected lymphatic area so thoroughly as to give a fair chance of non-recurrence. If this is anatomically possible, the next questions are, What are the chances of death as the result of the operation ? and What will be the subsequent functional result ?

" The primary object of operation in these cases being, therefore, cure, the limit of the radical operation is where there is no reasonable prospect of removing the whole disease, or where, along with a very poor prospect of success, there is a very high mortality from the attempt. In such cases I do not think the operation should be mentioned at all, for even when the

patient recovers from it, and has presumably two or three months added to his life, few would, I think, thank one for it, seeing that these two or three months have been spent in convalescing from a serious and, in the end, useless operation.

" But even in case where hope of cure or marked prolongation of life by radical operation is out of the question, operation may sometimes be advisable with the object of removing symptoms which are immediately threatening to life—such operations as tracheotomy, colotomy, etc.—or, in the second place, with the idea of taking the primary disease from a part—such as the mouth or throat—where its continued development means intense pain and trouble, and thus of substituting for these troubles an easier death from exhaustion. A *sine quâ non* of such operations must, however, be that they are reasonably free from immediate risk ; and with regard to the second class that there is a prospect of attaining the object of the operation, namely, the entire removal of the disease from the part operated upon. I do not think a dangerous operation is allowable for the relief of symptoms, however proper it may be if a cure may be hoped for.

" There are, then, two different objects to be held in view and two different questions as regards operation which we must bear in mind in treating a case of cancer, namely, Can we reasonably hope for a cure ? for if we can, a serious or dangerous operation is permissible ; or, cure not being possible, Can we decidedly ameliorate the patient's condition by operation, such operation, however, not involving any great danger to life."

In operations for cancer of the breast the author details and advocates the thorough radical operation, with the removal of the entire breast in all cases, the pectoral fascia, the lymphatic channels, and all the lymph-glands in the nearest groups, including the thorough dissection and clearing out of the axillary glands.

As regards the limits of operation for cure of breast-cancer, therefore, he would exclude from operation :

1. Cases of cancer *en cuirasse*.

2. Cases where there is a large mass in the axilla, involving the nerves.

3. Cases where large glands can be felt above the clavicle.

4. All cases where secondary cancer exists elsewhere.

In any case short of these he believes the patient should be allowed to choose. Even when the operation fails to cure the prolongation of life is often marked, much more so after the thorough operations than after the ordinary imperfect procedure.

As regards cures—that is, freedom from any recurrence for over three years —the author's statistics show that by the radical method of operating which he advocates the number of cures far outnumber, even in the comparatively few cases he has operated upon, the cures recorded by the older operators, which goes to show that this radical form of operation gives not only the best results as regards prolongation of life, but also the greatest proportion of cures. Of his 21 cases there were no deaths ; 12, or 57 per cent., cures ; 9, or 42.7 per cent., cases recurring externally or internally. This is the result obtained in all operable cases, and not in a selected series of favorable cases.

While the results are steadily improving, the proportion of cases which

succumb to cancer is still considerable, and will not, he thinks, be much reduced till patients and doctors understand that there is a good chance of radical cure from early and thorough operation in mammary cancer, and that a suspicious lump in the breast, especially in elderly women, is not a thing to be watched, for over 90 per cent. of the swellings of the breast in elderly women are cancerous.

Contrary to the usual dictum, it is now found that the most favorable of all cases for operation are those of atrophic scirrhus, and the more nearly a cancer approaches the atrophic form the greater is the chance of permanent cure. The author believes that the malignancy of cancer in the individual case has a great deal to do with the favorable result of the operation, more than the early period of the operation.

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Concerning Nephrectomy.—PERTHES (*Deut. Zeit. für Chir.*, Band xiii. Heft 3), after an exhaustive statistical study of the result of different operations upon the kidney, concludes that in all cases of hydronephrosis and pyonephrosis, and wherever surgical interference is indicated and the strength of the patient permits, the radical operation should be employed.

In long-standing cases of hydronephrosis, where large areas are involved and there are crises of colic, and in cases of pyonephrosis that endanger the whole system, the complete extirpation of the kidney should be the operation.

In contraindication to nephrotomy this operation makes possible a primary union and the return to health in a short time. This fact makes the danger of the operation much less than one would suppose at first sight.

We remove a sound kidney to free a patient from a urinary fistula. Should we produce a urinary fistula to save a worthless kidney ?

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The Sterilization of Catgut by Boiling in Water.—HOFMEISTER (*Centralbl. für Chir.*, 1896) has modified his procedure for the sterilization of catgut by boiling, and now believes that the following method yields a perfectly sterile and in every way satisfactory preparation :

The raw catgut is to be wrapped evenly in a single layer upon strong glass plates (or nickel-iron frames). The thread should be drawn as taut as possible and the two ends firmly knotted. If separate pieces of thread are wrapped upon the same plate or frame, the ends must be securely tied.

The cagut is then transferred :

1. To a solution of formalin in water (2 to 4 per cent.) for from twelve to forty-eight hours.

2. Wash in running water for at least twelve hours, to remove the excess of formalin.

3. Boil in water for from five to twenty minutes.

4. Preserve in absolute alcohol to which have been added 5 per cent. of glycerin and 4 per cent. of carbolic acid or 1 per cent. sublimate (in case metal frames are employed the sublimate should not be used). For use the holders have to be put upright in an oblong glass trough ; in this way the thread can be drawn easily, but still will not loosen itself spontaneously.

While the exact strength of the formalin solution and the length of time of the boiling do not influence the result in particular, the careful wrapping

and the thorough washing are indispensable to the attainment of a satisfactory result. The firm tension made in wrapping the gut is still further raised by the action of the formalin (therefore strong plates should be used) and must be maintained until the hardening is accomplished.

The plates must remain in alcohol for some hours before the knotted end of the thread is loosened. If the tension has been deficient, the thread gets thick and elastic like rubber, and cannot well be used for ligature-material.

If the formalin is not entirely washed out before boiling the gut, the thread will break easily.

The arrangement of the threads in but one layer permits of equal access of the formalin and of the washing and boiling water. The hardened and washed catgut may be preserved in alcohol indefinitely, without injury, before the boiling. It may also be boiled repeatedly, if the end of the thread is tightly knotted again, to maintain the tension.

The author claims for this procedure:

1. The absolute destruction of germs.
2. Preservation of the tensile strength of the catgut.
3. Avoidance of complicated methods and expensive instruments.

The thread, wrapped up once, need not be touched with the fingers from the beginning of the sterilizaton until used. The bacteriological examination of the gut thus prepared has proved it to be free from germs.

In Bruns's clinic the method has been in use since February, and has given satisfaction in every way.

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Immediate Suture of the Bladder after Hypogastric Incision.—DE VLACCOS, in the *Revue de Chirurgie*, 1896, No. 8, favors immediate suture of the bladder after suprapubic lithotomy. This method has been employed by Albert, Nicoladoni, Ultzmann, Kispert, Maximow, Vincent, Brenner, Irschik, Herson, Bassini, and others.

The author thinks the contraindications to the immediate suture are very rare; personally, he has never seen a single case. He cites an example with considerable alteration of the bladder-wall successfully sutured. The difficulty of absolutely closing the bladder should not deter surgeons from using the method, as a catheter retained in the bladder will keep it empty, and there will not be tension enough to cause leakage in the prevesical space. The suture may be made with silk or catgut. De Vlaccos prefers the latter. The method has been equally as successful in old age as in childhood and middle age.

He has allowed his patients to get about on the twelfth or fifteenth day.

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Conclusion and Practical Remarks on 300 Cases of Breast-excision for Malignant Disease.—SNOW, after briefly reviewing his experience in the cases mentioned in the title (*British Medical Journal*, 1896, No. 1868), concludes as follows:

Infection of the bone-marrow is the great obstacle to radical cure by operation in mammary carcinoma. This takes place in all ordinary cases within six months of inception, frequently earlier; its symptoms do not appear until within the second year; they may not be accompanied by nodular deposit or other palpable evidence of cancer for five or six years more. In

the class of cases known as "atrophic" the condition may be delayed for several years.

Hence, these latter excepted, apparent immunity from "recurrence for three years" is a wholly inadequate basis on which to pronounce the disease radically extirpated, unless insidious marrow-symptoms are also excluded by careful examination, and unless there is good reason to believe that excision has been performed before the marrow has become implicated. The most important practical point in excision of the female breast is a wide dissection of the subcutaneous connective tissue around the diseased organ, from sternum to axilla, from the subclavian fossa to the cartilage of the seventh rib. This tissue is the really dangerous tract to be feared as a nidus for recurrence; not, as the author holds, prolongations of the mammary parenchyma. But it can always be adequately extirpated by dissecting off a flap of healthy skin, and so bringing the edges to immediate union without undue tension, as was done in all his second class of cases.

No advantage whatever is gained by the destruction of an extensive skin-tract. In every single instance he has yet met with the utmost benefit that surgery could confer was perfectly compatible with the union of the greater part of the wound by first intention. Should the skin be infiltrated, no amount of ablation will avail to prevent reappearance, previously insured by the marrow-condition. One such case is now under his care. A single lady had the skin of the left side from clavicle to abdomen, from sternum to posterior axillary fold, removed by an eminent surgeon in June, 1895, and replaced by grafts from shoulder and thigh. The whole tract aforesaid is now a deep depression, at the bottom of which lie the ribs, covered by a thin cicatrix. The patient has extensive deposit above the clavicle, in the opposite mamma and axilla; the sites whence the grafts were taken being occupied by large keloid scars half an inch thick.

Another startling novelty, only to be mentioned with almost incredulous surprise, is amputation at the shoulder-joint for the purpose of procuring a covering flap from the deltoid.

If we encounter instances of scirrhus, or even of encephaloid (acute) carcinoma, of but two or three months' duration, no pains should be spared to eradicate permanently the disease by dissecting out the entire mamma, a wide area of subcutaneous tissue around, and the contents of the axilla; and at least one and one-half hours should be devoted to that purpose. On the other hand, in advanced cases of long standing it is futile to risk life by prolonged and heroic measures when we know there is a deep-seated nidus which we cannot touch. The utmost advantage we can attain is the removal of the gross lesions without risk; prompt union of the wound; and then, by after-treatment with opium and cocaine, to procure a state in which the disease remains stationary for years or advances with almost imperceptible slowness. Examples of this Snow expects to narrate in another contribution.

Partial amputation of the mamma for carcinoma is wholly inadmissible, unless for purposes merely of palliation. For the smallest scirrhus "kernel" extirpation should be thorough. Thus there could not have been a more favorable case for radical cure than that of a woman, aged forty-seven years, who appeared in August, 1892, with a growth the size of a bean, of two months' duration, at the upper part of the right breast, and without any gland

enlargement. As he was about to leave town another surgeon operated, and unfortunately contented himself with a bare removal of the tumor. In the following October the disease was found to be rapidly advancing in the remainder of the breast, and was then at once excised with the axillary contents; now, however, too late, as visceral metastases shortly became evident.

At the beginning of the period referred to (1876) evacuation of the axillary contents was only resorted to occasionally, and "recurrence" here took place usually within six months. It is now very justly the rule; and even the worst cases seldom show any superficial deposit for at least two years. Yet to this routine practice three exceptions should be noted : (a) intracystic cancer-growths ; (b) fairly recent atrophic cases ; and (c) scirrhus appearing close to the sternum, whence the axilla is much more slowly infected than from other regions of the organ, the lymph-current flowing primarily to the thymus and mediastinal lymph-glands.

Subphrenic Abscess and Resection of the Kidney.—Subphrenic abscesses resulting from suppuration of the spleen are of rare occurrence, and the case detailed by CRAMER (*Deut. zeit. für chir.*, 1896, Band 42, Heft 6), as operated upon successfully in Professor Bardenheuer's clinic, is of great interest.

In the beginning of April the patient had a high fever and pain in the left abdominal region. In May the symptoms were of pleuritis. In July the patient had the symptoms of typhoid fever. From September to the middle of October the patient appeared to be well, and then in November she became violently ill with symptoms pointing to a subdiaphragmatic suppuration.

The diagnosis was finally established in consequence of the low position of the spleen, the dulness over the lower portion of the left thorax, and especially upon the to-and-fro motion of an exploratory needle synchronous with the respiration, and from which pus had been withdrawn. In other words, the motility of the abscess and of the enlarged spleen.

Such abscesses of the spleen are rare, and arise from infarction after infectious diseases, as typhoid fever, pyæmia, malarial fever, articular rheumatism, etc., or may come through the contiguity of abscess in other organs. In operating the pleura should first be exposed, but not opened, to determine whether there is a pleuritic effusion or suppuration. If this is present, it should be opened and the abscess attacked through this channel. If, however, it is not involved, the incision should be closed and the abscess opened posteriorly beneath the diaphragm.

The treatment of the splenic abscess depends on the extent of the involvement ; it may be resected, or the entire organ may be removed if the disease is too extensive. The origin of subdiaphragmatic abscesses is frequently connected with disease of the pelvic viscera in women. The author reports such a case in which, after the opening of the abscess, the adnexa were successfully removed.

The author also reports a case of tuberculous abscess of the kidney cured by resection of the kidney and removal of the diseased portion. The section was made through sound tissue. The pelvis of the kidney was opened, and its internal aspect was seen to be healthy. The hemorrhage was not marked ; the wound was tamponed, as was the perinephritic abscess-cavity. During

the healing the dressing was changed daily, as it rapidly became soaked with urine. The amount of urine became less and less, and finally disappeared altogether. There was no post-operative fever. After the urine ceased to flow the granulating wound was drawn together with adhesive plaster and rapidly united. The urine is free from albumin, and the wound remained completely closed.

In the treatment of these cases the author believes nephrectomy is indicated when the hæmatogenic tuberculosis has invaded the major portion of the kidney, when the pelvis of the organ is involved and it is impossible to decide how far the disease extends. If the ureter is diseased, it should be removed as far as the disease extends at the same time. If this is not done, there is danger of establishing an abdominal ureter fistula that will not heal.

The cases reported show that there are forms of this disease in which a portion of the kidney may be resected and a portion of the organ be retained with the hope of re-establishment of function and a compensatory hypertrophy of the portion remaining.

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A Study of Pyæmia and Sepsis.—HENTSCHEL, in a monograph (*Cent. für Chir.*, 1896, No. 40), in studying this form of disease, classifies its manifestations under the forms of pyæmia, septicæmia, sepsis, and sapræmia.

Pyæmia is that condition produced solely by pyogenic micro-organisms. Septicæmia is that form in which the micro-organisms develop in the blood only (rare in man). Sepsis and sapræmia are systemic intoxications arising from a local infection.

He illustrates pyæmia by a case in which a tendo-vaginitis of the index-finger was followed by a suppurative arthritis of the shoulder-joint. The diplococcus lanceolatus (Fränkel-Weichselbaum) was found by microscopic investigation and cultures at both points, but would not produce suppuration after inoculation into animals.

In a second case pyæmia followed a furunculosis of the lip. The culture showed staphylococcus citreus and other forms.

Two other cases illustrate typical sepsis; *i. e.*, toxæmia. In both cases there was an absorption of toxins after gangrenous processes. One was a compound fracture of the leg followed by consecutive sepsis, which became systemic despite an amputation. The bacteriological examination showed the blood to be entirely free from bacteria or spores.

The second case on which a post-mortem examination was made showed how extensive the systemic involvement was. A periproctal abscess, with no tendency to healing, gave rise to the systemic infection. No bacteria were found in the blood. There was marked cell-necrosis. The symptoms were those of grave pyæmia. The author is of the opinion that in the production of these cases of pyæmia the absorption of the toxins is not the only question, but that the interchange between the living bacteria and the cells of the body is of more importance, although it should not be forgotten that the intoxication of saprophytic and pyogenic micro-organisms is greatly increased by their combination.

The Causation of Certain Malformations of the Extremities.—
HLAWACEK (*Deut. Zeitsch. für Chir.*, Band 43, Hefte 1 und 2, 1896) reports a
number of cases of defect in the development of the bones of the extremities.
He explains their causation as follows:

1. The radius, os naviculare, os multangulum majus, metacarpus, and the
two phalanges of the thumb, are formed by a transverse differentiation in the
original radial line of Gegenbauer's archipterygium.

2. If pressure is exercised, at a certain time, upon this radial line, through
a disproportion between the foetus and amnional cavity, when the develop-
ment and differentiation into its individual parts have not as yet progressed so
far that each part can develop further of itself, there may be produced a de-
struction of the radial line *in toto*, and through the same cause a pathological
position of the hand (as in cases of defective radius with but three or four
fingers on the hand): the distal portion of the proximal end of the radius
may escape this destruction (cases in which the upper portion of the radius
is present).

3. If this pressure is exerted at a period after the differentiation has already
taken place and development has progressed further, the injury becomes local-
ized to the particular part or to an injury to the punctum minoris resistentiæ
(epiphysiolyse), which is not direct upon the particular part, but influences its
later development (cases of rudimentary distal portion of the radius with
presence of carpal, metacarpal, and phalangeal bones).

4. The pressure may produce coalescence, and, as a result, total or partial
defect of the radius.

The author also reports a case of defective development in the femur seen
in a fourteen-year-old girl. The deformity involved the central proximal
portion of the femur, while the entire remainder of the limb was normal in
structure and development. There was an absence of the joint between the
femur and pelvis.

Metastatic Exanthemata of the Skin due to Septic Infection.—MEYER
(*Arch. für klin. Chir.*, Band 52, Heft 1, 1896), after a careful review of the
literature dealing with exanthemata found in contagious diseases, says that
the evidence is not sufficiently strong as yet to prove that they are true metas-
tases of cocci, but that the evidence clearly points in that direction.

Much more interest is attached to the group of observations in which the
same forms of bacteria have been found as those which apparently produce the
original disease. These are the cases of sepsis and pyæmia with cutaneous
metastases.

After reviewing a number of cases already reported, he details a case in
which the microscopic and bacteriological study showed that the case was one
of true metastases to the skin from a general systemic staphylococcus infec-
tion. Intracapillary masses of cocci which were found and must be considered
the cause of the eruption could only have reached their location through the
vascular system. The microscopic section showed that in the youngest erup-
tions, where there was still present inflammation of an acute type, there were
no cocci found in the epidermis, but were always first seen in the papillary
layer. In no section were the hair-follicles found to be infected, although
they were often in close contact with the foci of suppuration and are in the
majority of cases the point of entrance of impetiginous eruptions.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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The Electro-magnet in the Diagnosis of Particles of Iron or Steel within the Eyeball.—E. Valude (Paris), in a paper upon the use of the electro-magnet in ocular surgery (*La Médecine Moderne*, 7 Ann. No. 76), calls attention to its diagnostic value in some cases in determining that a piece of metal capable of attraction by the magnet is within the eye. Thus in the case of a doubtful foreign body suspended in the vitreous, the bringing of the magnet suddenly close to the eye would cause it to move visibly if subject to the magnetic attraction. The same result would be attained by bringing the instrument close to the eye and alternately closing and opening the circuit, making the magnet alternately active or neutral.

Even when the foreign body cannot be seen its presence and nature can be ascertained in this way when the proximity of the magnet causes pain through the disturbance of the position of the foreign body. Positive evidence of this kind would be conclusive. Valude, however, reports a case in which the failure to cause pain by bringing the magnet close to the eye was rather misleading, for the eye being subsequently enucleated a piece of steel was found within it. He points out, in this connection, that a more powerful magnet might have elicited the symptom.

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Formation of Artificial Pupil by Extra-ocular Iridotomy.—J. B. Lawford (London) describes (*Ophthalmic Review*, vol. xv. No. 178) and urges the advantages for certain cases of the operation proposed by Schoeler. He regards the operation as applicable to : (1) cases of opacity of the cornea involving the central area, but leaving some portion of the periphery clear ; (2) cases in which there is stationary partial opacity of the lens, either a small nuclear, sharply defined opacity, or an anterior polar cataract, the base of which is as wide, or nearly as wide, as the pupil ; (3) cases in which there is, as a result of disease or as a congenital defect, obstruction of the pupil by deposit on the anterior lens-capsule, the pupillary margin of the iris being free.

The operation is performed by making an incision in the cornea, close to but not at the sclero-corneal junction, and about 5 or 6 mm. in length. The knife is carefully withdrawn, so that the iris may not follow it through the wound. The blades of a pair of *fine* curved iris-forceps are then introduced through the incision, and the iris gently grasped close to the pupillary border and withdrawn. The forceps should have no teeth, but slightly

roughened or finely milled blades. The protruding portion of iris is picked up and divided by a single snip of the iris-scissors. The cut should be at right-angles to the pupillary margin, and should extend through half the width of the iris. The protruding part of the iris is then replaced with a spatula and a solution of physostigmine instilled.

Serum-therapy in Diphtheria of the Eyes and Post-diphtheritic Palsies of the Ocular Muscles. —R. Greef (Berlin), from a review of reported cases and the records of his own cases, finds (*Deutsche medicinische Wochenschrift*, 1896, No. 37): of forty-two cases of true diphtheria of the eyes, one had progressed so far toward recovery that the share of the treatment in producing the result is doubtful, and two cases terminated fatally in spite of the serum-injections ; but of the remaining cases the result was extremely favorable in thirty-seven. Cases of spurious diphtheria of the eyes have not been sufficiently distinguished from those of true diphtheria to decide yet as to the influence of serum-therapy upon their course. As to the prevention of post-diphtheritic paralysis of the accommodation, this method of treatment seems to be without the slightest influence ; and in the limited number of cases in which its action upon the course of diphtheritic paralyses of the ocular muscles has been observed, it has not been shown that any important beneficial influence is exerted by the antitoxin-serum in this respect.

The Management of Glaucoma.—S. O. Richey (Washington) has never seen a case of glaucoma, acute or chronic, that did not have a history of gout, inherited or acquired ; and regarding the condition as the local expression of a general dyscrasia, lays down the following propositions as a guide in its management (*Annals of Ophthalmology and Otology*, October, 1896) :
1. When syphilis is the agent of causation the indications are clear—antisyphilitic treatment. 2. Acute or chronic glaucoma of other origin finds its initial cause and beginning in the digestive tract. 3. A departure from the normal physiological processes in the digestive tract intoxicates slowly, progressively, and accumulatively both the vascular and nervous systems, producing a degrading tissue-change in various organs ; and interstitial ophthalmitis (glaucoma), an interstitial nephritis, etc., which may be precipitated into a violently active form by injury, exposure, a more than usually indiscreet meal, or by a severe emotional crisis. 4. That chronic simple glaucoma consists in a hyperplasia of connective tissue, involving ultimately the whole bulb, and cannot be cured by operation. 5. That the acute form is vascular in character and may be engrafted upon the chronic form. 6. That to meet the indications on this basis we must begin with the beginning of the disease and correct individual habits.

In the way of specific measures, Richey recommends in acute glaucoma the general hot-bath, the use of a myotic with taxis of the eyeball, the prompt exhibition of colchicine, the hot-bath repeated after several hours, if necessary, always keeping the patient warm after it. After gaining control of an attack, prophylaxis, as in the case of chronic simple glaucoma. In chronic glaucoma baths, always hot, several times a week, in a warm room, and immersing the whole body. The bath need not be hot enough (102° to 104°), or continued long enough, to produce sweating. A weak myotic

collyrium must be persisted in, with daily taxis for a few minutes, until the tension is normal and remains so. A mixture of sodium salicylate, ammonia, and taraxacum should be pushed to the point of physiological tinnitus; and continued as long as necessary, except suspending it to combat symptoms of irritable glaucoma that may arise, with colchicine, if it continues to act well. The intestinal tract must be soaked with hunyadi janos, three or four ounces being taken at bedtime, and repeated every night, perhaps in less quantity, until the stools become yellow.

Pigmented Striations in the Fundus.—B. WALSER (Vienna) reports (*Archives of Ophthalmology*, vol. xxv. No. 3) two cases of this condition. Both patients had normal acuteness of vision and normal visual fields, but gave histories of previous serious ocular inflammation. He proposes the following classification for such stripes: 1. Prevascular, attending retinitis proliferans. 2. Perivascular, with periarteritis. 3. Retrovascular, due to detachment or to folding of the retina. His cases were believed to belong under the last heading. The color of the stripes was gray, not brown.

Asthenopia and Nasal Obstruction.—P. W. MAXWELL (Dublin) has observed many patients with chronic aural catarrh who suffered from asthenopia, and who were relieved of the asthenopia by nasal treatment given with a view of benefit to the aural disease. He has found (*British Medical Journal*, No. 1865) that asthenopes who frequently or habitually breathe through the mouth are more likely to be benefited by nasal treatment than are those in whom the nasal mucous membrane is quite as abnormal, but who can breathe freely through the nose. The most usual causes of nasal obstruction, in this connection, are adenoids in the nasopharynx and enlarged turbinals. The former should be removed and the latter reduced by local treatment. Many of these cases would be relieved by glasses; but some get no benefit from any glass until the nose is cured.

DERMATOLOGY.

UNDER THE CHARGE OF

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Mycosis Fungoides.—E. BESNIER (*Pictorial Atlas of Skin Diseases and Syphilitic Affections*, Part I., 1896) presents a portrait representing the nodular and ulcerative stages of this disease (known also as granuloma fungoides) which is both true to life and excellent, but the notes and observations of this distin-

guished and lucid writer are even more valuable. The French school (with Besnier as one of its chief exponents) has done much to elucidate the many features of this disease. Until lately it had not been carefully studied, mainly because of its protean nature and the polymorphism of its manifestations, its periods of quiescence or of temporary remissions, and because of its frequently very prolonged course and duration. The case reported was that of a man, aged forty-seven years, the first affection of the skin having occurred in 1871, in the form of attacks of pruritus, with nocturnal paroxysms, worse in winter, but unaccompanied by any eruption. In 1872 smooth red patches on the trunk and abdomen, varying in intensity but always extremely pruriginous, were first noticed. Next year there was a lull. The following year an exacerbation of the disease compelled the patient to enter the St. Louis Hospital, where he stayed two months, and was discharged with the diagnosis of " prurigo." The following year he again entered the same hospital under Lailler, when the model was made and labelled " lichen ruber "(?). The whole body presented finely papular areas of a common variety of the poorly developed lichenoid patches which occur in the initial stage of mycosis. In 1876 there were very frequent attacks of boils, succeeded in the following years by a recurrence of the previous eruptions with severe and rebellious itching. Discouraged by the failure of all treatment, and his general health being good, the patient gave up seeking medical aid and went back to his business. Not until 1887 (i. e., sixteen or seventeen years after the onset of itchy and cutaneous eruptions) did he return to the hospital. In the preceding two months round, red, pea-like lesions had developed on the red squamous patches over the front of the thorax, followed soon by small knob-like tumors which became united at their bases by diffuse swelling, which spread from right to left toward the axillæ, and from that time to his death the production and evolution of tumors never ceased for a moment. All the nodules and tumors did not undergo the same uniform process of evolution ; some softened more or less rapidly in the centre, broke down, ulcerated, leaving craters with yellowish bases, wide, gaping openings, suppurating and discharging freely. During the year 1888 the increase in the number and agglomeration of the tumors was so great as to form a kind of shield over the thorax, around which lichenoid patches and knob-like tumors continually formed ; numerous hypertrophic patches developed on the neck, around the axillæ, and elsewhere on the trunk, but there were very few on the limbs. Simultaneously some of the patches or tumors healed imperfectly, leaving a prominent and irregular scar. The general health continued good, and he suffered little or not at all except from the persistent itching. All the lymphatic glands were very large, but there was neither leucocythæmia nor enlargement of the spleen. Emaciation later set in, and the patient for the first time became anxious. The following year loss of appetite, rapid emaciation and weakness occurred ; the lichenoid and itching patches remained persistent, but all the tumors shrank, and the purulent secretion diminished greatly. The patient succumbed a month later. No important macroscopic lesion was observed other than increase in the size of the spleen and tumefaction and ulceration about the upper laryngeal orifice, aryteno-epiglottidean folds, and the posterior surface of the larynx. The trachea, lungs, pleura, alimentary canal, and liver were all normal.

Besnier very properly calls attention to the following practical diagnostic points : (1) In all cases of doubtful itching skin disease, persistent, not amenable to ordinary treatment, whether it be like some indeterminate " erythrodermia," or psoriasis, or eczema (squamous, diffuse, discoid, or circinate), or like an urticaria, not amenable to treatment, or a lichenoid prurigo, and the like, the question of the possibility of mycosis fungoides in an early stage must be considered. The physician who remembers this may avoid an error in diagnosis. (2) The initial premycosic stage is not an incubation, properly so-called, but is the disease in action, not only in the parts which show lesions, but also in the apparently healthy parts, where its subjective manifestation is itchy.

[The case is referred to because it illustrates the peculiar and insidious course that this disease often pursues, rendering the diagnosis difficult.]

Bullous Dermatitis from Quinine.—J. C. JOHNSTON (*Journal of Cutaneous and Genito-Urinary Diseases*, July, 1896) records the case of a man, aged thirty-seven years, who had before experienced two attacks of quinine-dermatitis from taking two two-grain quinine pills. Two fifteen-drop doses of compound tincture of cinchona caused the present outbreak. Two days after the ingestion there was intolerable itching, and soon vesiculation on the genitalia, face, and ears, and the whole general surface of the body rapidly became the seat of a scarlatinoid dermatitis. As this began to decline the palms and soles became affected with blebs, some of which were large in the first outbreak, as much as eight ounces of serum being evacuated. The blebs recurred, and it was five or six weeks before recovery was complete, the palms being the last to recover. The chief points of interest are the rarity of the bullous manifestation from quinine, and the great disproportion between the violence of the cutaneous outbreak and the small amount of the drug ingested.

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Tubercular Leprosy of the Face and its Treatment.—E. BESNIER (*Pictorial Atlas of Skin Diseases and Syphilitic Affections*, Part IV., 1896), in considering this subject gives two photographs of a patient, one of which was taken in 1888, before treatment, the other in 1896, after eight years had elapsed, showing wonderful improvement. Internal treatment (chaulmoogra oil up to 300 drops, salol up to 5 grammes daily) was perseveringly administered, whilst the tubercles were destroyed with the cautery and the methods for external reduction to be referred to. Chlorate of potassium, 15 grains daily, was taken for a period of three years (by the patient, unknown to the physician), but Besnier is not willing to say how far this latter medicine assisted in the improvement, which was already, as a matter of fact, accomplished. The point of interest in the local treatment is the beneficial result of a long course of electro-galvanic cauterization, which Besnier regards as a certain means of reducing leprous tubercular formation wherever localized. The thermo-cautery may also be used for the same purpose, but its effects are more difficult to limit ; cicatrization of the ulcers after the crusts separate takes longer, and, above all, the plastic results are much less satisfactory. By the method advocated each tubercle is cauterized interstitially by means of single or multiple points, or by electro-caustic bars

when the surfaces to be destroyed are large. After cauterization should follow daily spraying with weak carbolic-acid water and dressing with sublimate or iodoform gauze, together with the management of cicatrization by means of nitrate of silver or zinc pencils, and the like. The same galvano-caustic application should be made to all affected points of the mucous membranes of the lips, nose, mouth, tongue, and pharynx. By their means it is quite easy to check and destroy the leprous foci so common in all these parts, and the results obtained are very remarkable. In the patient whose case is described, and in many other cases, the treatment was effective in limiting and destroying the disease in the mucous membranes.

[The experience of this writer corroborates that of other observers, namely, that much can be done by both local and general therapeusis to mitigate and relieve the manifestations of this disease, especially in countries where the disease is not epidemic.]

OBSTETRICS.

UNDER THE CHARGE OF

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The Use of Steam as an Antiseptic in the Treatment of Puerperal Endometritis.—In the *Centralblatt für Gynäkologie*, 1896, No. 49, KAHN reports his results in the treatment of septic puerperal endometritis by the intrauterine injection of steam. The apparatus consisted of a kettle, heated by an alcohol-lamp, to which were attached a thermometer and also a hose terminating in an intra-uterine applicator having a hollow stem or handle. The thermometer should register 200° C. before the steam is used. He is accustomed to begin with steam at a temperature of 100° C. for two minutes, then allowing the temperature to rise to 115° C. for one minute. The higher the temperature of the steam the better is the result. Very little complaint of pain was made by patients; in some cases uterine contractions caused afterpains. In cases where pieces of placenta or membrane have been left within the uterus they must be removed, either by fingers or curette, before the steam is used. An intra-uterine douche is usually employed for two or three days after the use of the steam.

His first reported case was that of a multipara who had fever on the third day after labor. The lochial discharge was very foul. Pieces of placenta were removed from the uterus, but without result. The fever and foulness of the lochia remained. Accordingly steam was injected for one-quarter of a minute at 105° C. It caused no pain, but slight improvement, and on the

following day it was used at a temperature of 112° C. for one-half of a minute. The temperature steadily fell and the patient made a rapid recovery.

The second case was that of a primipara who had no attendance at labor, and who had slight fever which resisted intra-uterine douches. Steam was employed at 110° for one-quarter of a minute. The patient seemed much improved, but five days afterward a sudden rise of temperature accompanied the development of pyæmic abscesses in the elbow and in the clavicle. These subsided, however, and the patient ultimately recovered.

His third case was that of a multipara in whom steam was employed at 105° C. for three-quarters of a minute. This was followed by intra-uterine injections. The microscopic examination of the discharge from the uterus showed a great number of cocci in which was a diplococcus.

The fourth case was a multipara who was aborting at about three months. The placenta was retained and a very foul discharge resulted. She was admitted to the hospital suffering from fever. Under chloroform-narcosis a retained placenta was delivered and the uterus thoroughly douched. A temporary improvement only followed. Steam was used at a temperature of 105° C., and its use was followed by immediate improvement in the symptoms. Bacteriological examination of the contents of the uterus showed an abundance of gonococci present. The patient collapsed after an intra-uterine douche, but rallied again. On the day following chills and fever developed, and steam was again employed for one-quarter of a minute at 115° C. The temperature fell, but subsequently rose again and was accompanied by vomiting. Steam was again applied at 110° for one-quarter of a minute. Prolonged irrigation of the uterus was tried, but without benefit. The patient speedily failed, dying in collapse.

His next case was that of a multipara who had a normal labor, but who became septic. The uterus was emptied of bloodclots and pieces of membrane and packed with gauze. As fever increased steam was applied at 110° C. for one-half of a minute. Among the contents of the lochia were found tubercle-bacilli. The patient made, however, a good recovery.

The seventh case was that of a multipara who had had *placenta prævia lateralis* and had suffered from hemorrhage. The lochia was foul. The patient did well for a few days, and then had a severe chill with high temperature. Steam was employed at 115′ C. for one-half a minute. Its use was followed by improvement in the patient's general condition. This patient ultimately made a good recovery. The secretion from the uterus was examined and found to be sterile.

In his eighth case, a primipara, a considerable mass of placenta had been left within the uterus, attached to its anterior wall. Steam was injected for one minute at a temperature of 115°, causing vigorous contractions in the uterus. Bacteriological examination of the lochia revealed the presence of gonococci.

His ninth case was that of a multipara taken with chills and fever and severe pain in the abdomen. Steam was employed at 100° C. for two minutes. The temperature, however, remained for some days apparently uninfluenced by the use of steam. The patient finally made a good recovery.

From his experience Kahn concludes that steam produces an effect upon the uterus in several ways. It increases the sensitiveness of the uterus;

stimulates contractions; the foul odor from the lochia disappears, while in no instance have bad results afterward been observed. The advantages claimed for this method are its efficiency in destroying bacteria within the uterus and also its favorable effect upon the general condition of the patient by stimulating the circulation of the blood and of lymph.

Retroversion of the Pregnant Uterus, with a New Method of Treatment.

—MURDOCH CAMERON, in the *British Medical Journal*, 1896, No. 1870, reports a case of retroversion of the pregnant uterus and describes his treatment. He has found that disturbances of the bladder are among the first symptoms of this condition. Overdistention is frequently present. In most cases the uterus can be replaced before the third month if an anæsthetic be given. In a small number of cases impaction with adhesions is present, and extirpation of the uterus or treatment by abdominal incision is required. In fatal cases retention of urine becomes complete. Fever is present and bearing-down pains at the pelvic outlet, with great restlessness, delirium, intermittent pulse, coldness of the extremities, convulsions, and possibly rupture of the bladder. Previous to this case Cameron had never met one in which reduction was impossible.

The patient was a multipara who had enjoyed good health. The first symptom noticed was disturbance of the bladder, retention of urine being complete, with vomiting and constipation. The bladder was emptied by catheter and a considerable amount of blood was found in the urine. The patient was seized with labor-pains and hemorrhage. She was removed to a hospital. Upon examination under chloroform the os uteri was found above the symphysis. The bladder was irrigated, when bloodclots and shreds of mucus were removed. A blood-cast of the ureter, some fifteen inches long and about the thickness of a quill, was expelled. As the patient's condition was becoming critical, abdominal section was performed. In order to empty the bladder an opening was made upon its anterior surface outside the peritoneum. A large quantity of bloody urine and clot was extracted. Its walls were very much thickened. An assistant pressed the uterus up through the vagina while the operator raised the womb with great difficulty out of the pelvis. The bladder incision was sutured with fine silk and a double catheter was left within the bladder. The abdominal wall was closed in the usual manner. The patient made an uninterrupted recovery and was subsequently delivered of a healthy male child. Cameron calls attention to a serious complication in these cases which follows the sudden relief of a suddenly distended bladder. If urine be rapidly removed, hemorrhage is apt to follow, and hence the bladder should be slowly emptied or boric solution injected as the urine is withdrawn. A blood-cast of the ureter has seldom been observed.

The Results of the Modern Cæsarean Section.

—In the *Archiv für Gynäkologie*, 1896, Band 52, Heft 2, STREBEL repeats the proposition of Wyder to the effect that craniotomy upon the living child must cease so soon as Cæsarean section shows an equally low mortality-rate for the mothers. He recalls the fact that at the hands of Leopold, Sänger, and Braun the mortality of Cæsarean section has fallen to 8, 4, and $3\frac{32}{100}$ per cent., respectively. He

does not consider symphysiotomy as offering greater advantages than Cæsarean section. Strebel reports ten cases of Cæsarean section in Wyder's clinic at Zurich, which may be summarized as follows:

Case I. was that of a multipara who had lost a child in difficult labor, and who had a pelvis whose true conjugate was 5 cms. It was determined to perform hysterectomy, as the woman could never bear a living child in the natural way. Hemorrhage was prevented by an elastic ligature about the cervix, the ovarian arteries were tied, the uterus amputated two fingers' breadth above the ligature, and the stump closed with buried-silk sutures through the muscle and fascia, the serous edges being brought together by continuous suture. The stump was dropped, and the abdomen closed without drainage. An uninterrupted recovery for mother and child followed.

[It is interesting to note in the report of this case that no mention is made of ligature applied directly to the uterine arteries. The operator seems to have trusted to his firm closure of the stump by buried-silk sutures, followed by the continuous suture of the serous surfaces. Should it be found that this method is reliable, it would certainly avoid the danger of wounding the ureters.—ED.]

Case II. was that of a multipara on whom craniotomy had been previously done. Her pelvis was a justo-minor, and the operation was cœlio-hysterotomy, the uterus being sutured and returned to the abdominal cavity. Mother and child made a good recovery.

Case III. was a multipara who had a flat rhachitic pelvis, with a true conjugate of 5½ cms.; in this case cœlio-hysterotomy was done, the uterus being sutured and retained. Mother and child recovered well.

Case IV. was a primipara in whom the pelvic deformity and operation employed were identical with the preceding. The result was also good.

In Case V., in a multipara who had lost three children, the simple flat pelvis was the deformity present. Cœlio-hysterectomy was successfully performed, mother and child surviving.

In Case VI., a primipara was found to have a simple flat pelvis. The forceps had been applied, and efforts made at delivery before the patient entered the hospital. The contraction-ring was well marked, and cœlio-hysterectomy was performed in the interests of mother and child. After the child was extracted hemorrhage from the womb occurred; it was impossible to suture the uterus, although every means was employed to secure its contraction. Hysterectomy was performed, and, as it was feared that the uterus had become infected, the stump was left in the lower angle of the abdominal wound. The mother recovered, but the child did not survive.

Case VII. was that of a multipara with justo-minor pelvis, who had had repeated premature labors, followed by the death of the child; here cœlio-hysterectomy was performed with good results for mother and child.

Case VIII. was that of a primipara with an obliquely contracted pelvis. Cœlio-hysterectomy was performed, and some difficulty was experienced in stopping hemorrhage in the vessels of the right broad ligament; these were secured, and the stump closed and dropped. The patient's recovery was complicated by cystitis. Union by first intention occurred in the wound until the eighth day, when vomiting, abdominal distention, and sensitiveness to pressure developed. The lower angle of the wound reopened,

and a mass of necrotic material was discharged. The patient perished on the forty-eighth day after delivery. Post-mortem examination revealed diffuse purulent peritonitis as the immediate cause of death. The child survived.

In the ninth case enchondroma of the pelvis made natural birth impossible. The patient had lost a child with the use of forceps. Cœlio-hysterectomy was done, with a favorable result for mother and child.

The tenth case was one of inoperable carcinoma of the vagina. Here again the elastic ligature failed to control the vessels in one of the broad ligaments after the amputation of the uterus. The vessels were secured, however, and the stump closed by buried sutures. The patient made a good recovery from the operation, dying from cancer nine months afterward at her home. Her child survived.

[This array of cases in Wyder's clinic certainly helps to support his assertion that by modern surgical methods the mortality-rate for mothers is now equally low in craniotomy, symphysiotomy, and Cæsarean section; this being the case, craniotomy upon the living child is certainly not justifiable. —Ed.]

Gonorrhœal Endometritis Causing Premature Separation of the Placenta.—In the *Monatsheft für Geburtshülfe und Gynäkologie*, 1896, Band 4, Heft 3, MASLOWSKY, of St. Petersburg, reports the case of a patient in her first pregnancy, who suffered from pain and hemorrhage. Her history showed that about the fourth month of pregnancy she had a discharge of an irritating nature. Her husband had had gonorrhœa seven months before marriage. The day before the hemorrhage began the patient had a very light chill, which was scarcely noticed. On examination the pregnancy was found to be in the end of the ninth month, and no evidence of placenta prævia was present. An effort was made to stop the hemorrhage by putting the patient at rest, applying ice to the abdomen, and using Viburnum prunifolium and opium suppositories. The hemorrhage gradually ceased, and on the second day the use of ice was abandoned. The pain ceased entirely upon the fourth day after treatment began. The uterus emptied itself, however, shortly afterward, a living child being born. Involution proceeded imperfectly, but the mother made a good recovery. A bacteriological examination of the placenta and the secretion from the uterus was made, and pus-cells and gonococci were found. The child developed a conjunctival catarrh without the presence of gonococci. On examining the placenta an area was found in which separation had occurred prematurely. Microscopic examination of this portion of the placenta showed the basal decidua infiltrated with nucleated round-cells, and leucocytes and abundant extravasation. The bloodvessels were engorged; the chorion and amnion were without alteration. Gonorrhœal endometritis had been present, and had caused the premature separation of a portion of the placenta.

Organic Heart-disease during Pregnancy and Labor.—In the *Medical Chronicle*, October, 1896, LEA reports seven cases of heart-disease in pregnant women, with the history of labor. He calls attention to the tendency

to fatty degeneration and failure of the cardiac muscle which arises during the latter months of pregnancy, even when valvular disease is absent. If compensation is perfect before pregnancy begins, the prognosis for pregnancy and labor is good; if, however, the heart is failing, this failure will increase during pregnancy, gradually becoming worse as labor approaches. Abortion frequently occurs in these cases. Labor with these patients is very serious through engorgement and failure of the right side of the heart. A patient may even pass through labor only to fail rapidly several days afterward, probably as the result of degeneration in the heart-muscle. Mitral lesions are worst of all, because pregnancy favors the engorgement of the right heart which this condition causes. Lea reports seven cases, in four of which recovery occurred, while in three a fatal termination happened. The cases which recovered were comparatively young women in whom compensation was well established. In one, a multipara suffering from mitral regurgitation, the patient had suffered during a former labor from the effects of this complication. It was necessary to deliver the child with forceps. In the second pregnancy mitral insufficiency became prominent at five months. A second pregnancy followed two years later, and again at five months mitral insufficiency was well marked. There was also anasarca, with great breathlessness. A living child was delivered by forceps, mother and child making a good recovery. The patient recovered rapidly from her confinement.

The first fatal case was that of a primipara with a systolic mitral *bruit*. Labor was not especially difficult, the child being small, and having been dead several days. The patient's dyspnœa was so great that she could not lie down during the second stage of labor. Immediately after delivery the patient failed, and could not be resuscitated. Post-mortem examination showed the right heart much distended, and containing firm clot. The second fatal case had failing heart and albuminuria; it was that of a multipara who had suffered from chronic bronchitis. The urine was highly albuminous. Although labor was not especially difficult, the patient died on the eighth day after confinement, of heart-failure. The third fatal case was that of a multipara with greatly enlarged heart and dilated right ventricle; a large amount of albumin was found in the urine. The patient recovered sufficiently to leave the hospital three weeks after delivery, but died at her home three weeks later. Advanced mitral disease was present.

In reviewing the subject, attention is called to the fact that the induction of labor is rarely successful in these cases. The patient frequently comes into premature labor spontaneously, and is readily delivered. During labor extraction of the child should be made very gradually, and the second stage of labor should be as short as possible. Care should be taken to keep pressure upon the abdomen to prevent the rapid fall in intra-abdominal pressure when the uterus is emptied. During the third stage of labor free hemorrhage is beneficial, as tending to relieve the right side of the heart. When the heart fails at labor strychnine, digitalis, and nitrite of amyl are indicated.

GYNECOLOGY.

UNDER THE CHARGE OF

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Tuberculosis of the Ovaries.—Wolff (*Archiv für Gynäkologie*, Band lii. Heft 2) concludes an elaborate article on this subject by denying the probability of primary infection of the ovaries, since the changes in the ovisacs are so slight as compared with the advanced degeneration in other organs. He believes that there is direct infection of the peritoneal covering of the ovaries, transmitted either through the tubes, or from the pelvic peritoneum. It is, of course, impossible to exclude as an etiological factor the entrance of bacilli, carried through the bloodvessels from distant organs, though this mode of infection must be exceptional. In all the writer's cases there was no doubt as to the fact of direct infection.

The question of the transmission of tuberculosis from the mother to the fœtus through the medium of the infected ovum is an interesting one. Although it must be admitted that the development of such an ovum is arrested, it is possible that the tubercle-bacilli from an infected Graafian follicle after the rupture of the ovum may, together with the latter, enter the uterus and infect it during development of the ovum.

Ovarian Tumors Complicating Pregnancy.—Hohl (*Archiv für Gynäkologie*, Band lii. Heft 2) in a paper on this subject summarizes as follows:

1. During pregnancy ovariotomy should be performed during the early months if possible. Artificial abortion may be induced in cases in which the tumor is intraligamentous, or is firmly adherent, so that an operation would be difficult; puncture is not to be considered.

2. During labor the tumor should be replaced, if possible, under anæsthesia; if this does not succeed, puncture may be resorted to, with subsequent vaginal incision if necessary. In the case of solid tumors, when the child is living, Cæsarean section is indicated, followed by ovariotomy, or the latter may be postponed until the puerperium. It is not justifiable to perform ovariotomy alone during labor.

3. If performed during the puerperium, the operation should be done not later than the second week.

Closure of the Abdominal Wound.—In discussing this subject before the International Congress at Geneva (*Annales de Gynécologie et d'Obstétrique*, No. 9, 1896) Bantock offered the following conclusions: 1. Suppuration of the abdominal wound is due not to the presence of bacteria, but to foreign bodies or strangulation by tight sutures. 2. In many cases simple through-and-through sutures are sufficient. 3. In stout patients it is better to close the peritoneum separately and the remaining layers of the wound with one or

two series of sutures. 4. Silkworm-gut is the best for interrupted sutures and catgut (*not* chromicized) for buried sutures.

LE TORRE thinks that it is not sufficient to unite the fascial edges alone. The edges of the muscle should also be included in the sutures.

HOWITZ believes that just as little of the peritoneum as possible should be included; in fact, he approves of the plan of some operators not to suture the peritoneal edges at all, but to allow them to unite toward the abdominal cavity. Patients should not be allowed to leave their beds until three weeks have elapsed.

CONDAMIN recommends a tier-suture in the form of corset-lacing, especially in large wounds.

(The speakers seemed to be evenly divided in their advocacy of tier- and through-and-through sutures.)

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Vaginal Extirpation of the Uterus.—SCHRAMM (*Archiv für Gynäkologie*, Band lii. Heft 2) reports thirty-three cases of vaginal hysterectomy, with a mortality of 15.1 per cent. He prefers clamps to ligatures for the following reasons: 1. The operation is shorter and easier. 2. Less blood is lost and there is less risk of secondary hemorrhage. 3. In cases of carcinoma the resulting necrosis causes the destruction of the diseased tissue not removed at the time of operation. 4. Even in advanced cases the operation is free from danger. 5. The after-treatment is simpler and there are no ligatures to be removed subsequently.

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Tuberculous Ovarian Cyst.—EHRENDORFER (*Wiener klin. Wochenschrift*, No. 15, 1896) reports a fatal case of ovariotomy in which at the autopsy tuberculous nodules were found in the pelvic peritoneum and the adnexa on the left side. None of the other organs were affected. The inner wall of the cyst (intraligamentous) was studded with tuberculous nodules, though the corresponding Fallopian tube was healthy. It was impossible to determine whether the disease developed primarily in the ovary or was transmitted through the tube.

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Treatment of Retrodisplacement of the Uterus.—KUESTNER (*Ibid.*), after an exhaustive review of the statistics of various operators, using all the different methods of treatment, arrives at the following conclusions:

1. Although none of the operations for the cure of retroversion restore the uterus and adnexa to an absolutely normal position, the new relation of the pelvic organs is preferable to the former displacement.

2. A sharp distinction must be drawn between cases of movable and adherent retroversion. The adhesions must first be separated, after which the treatment in both cases is the same.

3. The abdominal cavity should not be opened for the purpose of separating adhesions unless these are too fine to permit detachment of the uterus by massage or Schultze's method.

4. Coeliotomy is preferable to anterior or posterior colpotomy, since adhesions may be more thoroughly and safely separated by the abdominal route, and, moreover, conservative operations on the adnexa can be carried out more satisfactorily.

5. The test of the value of any given method of fixing the uterus anteriorly is that it should keep the organ in a normal position, and that its functions should not be interfered with.

6. The results obtained by retro- and vagino-fixation and by Alexander's operation prove that the uterus may be maintained in a good position, but it has been shown that after vagino-fixation the functions of the organ are disturbed.

7. The latter operation should, therefore, not be performed in the case of women who are likely to conceive subsequently; in those who are not liable vagino-fixation has given excellent results, especially when supplemented by colporrhaphy.

8. When the adhesions are extensive the best operation is cœliotomy with ventro-fixation according to Olshausen's method. Conservatism should be practised as far as possible, especially in young subjects, in whom a portion of ovarian tissue should be left. If the tubes and ovaries are not seriously affected, it is sufficient merely to separate adhesions.

9. Alexander's operation is preferable in cases of movable retroversion, since it restores the uterus as nearly as possible to a normal position.

10. The indications for the operative treatment of retrodisplacement are furnished by the duration of the trouble, the negative results from the use of pessaries, and the aversion of the patient to palliative measures. A condition of the vagina which prevents the use of pessaries furnishes a positive indication.

11. Since prolapsus is generally the result of retroversion, the maintenance of the uterus in a normal position is the essential object to be aimed at. This is best attained by ventro-fixation, supplemented by plastic operations on the vagina.

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Vaginal Extirpation of the Cancerous Uterus.—OLSHAUSEN (*Berliner klin. Wochenschrift*, No. 23, 1896), in an address before the German Congress of Surgery, reviews the history of the operation in Germany, showing the improvement in technique and results. He considers in turn the choice of cases, preparatory treatment, technique, and after-treatment.

With regard to the choice of cases, he lays down the rule that a radical operation should not be attempted when the presence of disease in the glands or parametric tissues can be demonstrated. He believes that too many patients are subjected to operation in whom the chances of cure are practically *nil*.

With regard to the decision as to suitable cases, the old rule that the uterus must be so movable that it can be drawn down to the vulva does not now apply; the natural resistance of the healthy tissue in young subjects may prevent this. Rectal palpation furnishes the most useful information, as in this way small nodules and affected glands can be detected, even in an early stage of the disease.

In Germany during 1887 and 1888 only 28 per cent. of cases of cancer of the uterus were regarded as suitable for a radical operation, while during 1895 and 1896 the number rose to 40 per cent. The difference is attributed to the greater intelligence of general practitioners and the earlier recognition of initial symptoms.

It was formerly the custom to prepare patients for operation by preliminary curettage and cauterization of the diseased tissue, but now this is done immediately before the operation. The vagina and vulva are then thoroughly disinfected, and fresh instruments are used subsequently. After curettage it will often be found that the bladder-wall is involved, when it is better to abandon the operation. Even after the peritoneal cavity has been opened and the uterine arteries tied it is still better to stop at this point, if it is found that the disease has extended beyond the uterus. The writer's technique presents no special points of difference from that ordinarily adopted. He uses ligatures, which are cut short. The adnexa are not removed except in cases of carcinoma of the corpus uteri. After ligating the broad ligaments and removing the uterus the stumps are fixed in the angles of the wound, and when all bleeding has stopped the peritoneum and vagina are sutured with catgut and a loose tampon of iodoform-gauze is left in the vagina.

The after-treatment consists in letting the patient alone as far as possible. The tampon is removed on the second day and the woman is not touched until the end of the third week. Clamps are utterly rejected because of the danger of infection.

The writer condemns the sacral and parasacral methods of operation, since they are necessary only in cases which he regards as unsuitable for extirpation.

In 139 vaginal hysterectomies performed by him since April, 1894, there were only three deaths, while in his last 100 cases there was only one death, due to pyæmia, from which the patient was suffering before the operation.

As regards permanent results, he calls attention to the fact that German statistics are steadily improving, so that it is now possible to assert that there is hardly an organ in the body in which operations for the cure of cancer can be performed with such confident expectation of a permanent good result as in the uterus.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

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AND

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Anticholera Inoculation.—Dr. E. Harold Brown (*Indian Medical Gazette*, July, 1896) has employed anticholera inoculation at Darbhanga with fair results. Cholera broke out in the jail, and in nine days there were nine cases. On the tenth day 172 prisoners were moved into camp twelve miles away, and 53 were left behind, and on the same day there were three new cases in the camp and another in the jail. On the following day two new cases occurred

in the camp, and arrangements were made to inoculate such as were willing to submit to the operation. All wanted it, but it was decided to inoculate but 86, and these were not picked men, all being stood in line and the alternate men chosen. Within half an hour after the operation there was pain, which steadily increased until it became very severe. Fever came on within three hours, 102.5° being about the average temperature. Before four o'clock in the afternoon every man who had been inoculated was in bed with fever. Six new cases occurred among those not inoculated, and on the following day two more from the same class, and all proved fatal. Two days afterward two cases occurred among the inoculated; both recovered. Another and last case occurred among the inoculated—a man, sixty years old, who had had diarrhœa for thirty hours before the inoculation. He died the day following. Thus, of 86 inoculated subjects three were seized and one died, and of 81 not inoculated eight were taken, and all succumbed.

Twenty-five of the prisoners left in the jail were inoculated on the day following the first operations in camp. One, an attendant in the observation-ward, was attacked and died the same day. Three days later a second case occurred which resulted fatally. In the meantime three inoculated persons were attacked and died. In all 111 were inoculated, and among them were five cases, three of which were fatal. 108 were not inoculated, and among these were eleven cases, all of which were fatal.

Sterilization of Public Water-supplies.—The utter worthlessness of all domestic filters, with the exception of the Pasteur-Chamberland and the Berkefeld, which differ only in the substitution of kieselguhr, an 'infusorial earth, for the kaolin of which Pasteur's was made, though more recently superseded by a special blend of the clays used for the finest kinds of porcelain, has been well known to bacteriologists ever since the exhaustive examination of nearly every pattern in the market by Plagge, of Berlin, and is now generally recognized by all competent judges of the subject. Sand, vegetable or animal charcoal, spongy iron, polarite, etc., will, by intercepting suspended solid patches, render turbid waters perfectly clear; and most of these materials are able to remove a greater or less proportion of dissolved organic and even inorganic substances; but one and all are incapable of arresting the passage of bacteria, and in practice are found actually to foster their growth; the organic matter retained in the filtering-material forming a hotbed for their cultivation, their numbers being frequently far greater in the filtered than in the unfiltered water.

The purification of water in the sand-filters used for public supplies is, as Proskauer has shown, effected, not by the sand—the action of which may be described as "multiple subsidence," the solid particles in suspension being attracted by and adhering to every face of each grain of sand so long as the movement of the water is almost imperceptible, though lifted and carried through if this be accelerated—but by the vital processes in the growth of the green, algoid film which forms on the surface of the sand, until by its density it ceases to permit the further passage of the water. It is this alone that removes dissolved matters and bacteria, reducing the number of these in the cubic centimetre from hundreds or even thousands to tens; so long as it is intact and the flow of the water does not exceed four inches (10 cms.)

per hour, the dissolved matters providing a pabulum for its growth. Pasteur's filters, on the other hand, while clean, have, like clean sand, no power of removing substances in solution, but they are absolutely impervious to even the smallest bacteria, and the filtrate is perfectly sterile. They are now everywhere adopted in bacteriological laboratories, and are, though slowly, making their way in private houses; but until recently the extreme tediousness of the process and the impossibility of securing equal impermeability in large filter-tubes have seemed to preclude the application of this method of filtration on a large scale. Messrs. Defries, the sole licensees for the United Kingdom, have, however, by an ingenious arrangement overcome the difficulty and have set up for the municipality of Darjeeling an installation capable of furnishing a supply of 150,000 gallons daily, the further increase of which will be simply a question of additional filters; and already the authorities at Peshawar and other Indian towns have ordered the same.

The "unit" of the system consists in a drum or vertical cylinder of soft cast-iron about three feet in diameter and eighteen inches in height, lined with an acid-resisting material and provided with a movable cover, held down by screwed and hinged clasps on a gutta-percha seating. Each cylinder is divided by a diaphragm into two compartments, the upper being about twice as deep as the lower and containing 150 of Pasteur's filter-tubes, held mouth downward by thick India-rubber collars in as many circular apertures in the diaphragm. The upper apartment has an inlet for the unfiltered water and an outlet or drain open only when the filters are being cleaned, while the lower has an outlet for the filtered water, and each has a small pipe with a stopcock; the lower for pumping in air for the purpose of testing the filters, and the upper for injecting the acidulated water used in cleaning.

The inlets and outlets are provided with gun-metal valves and communicate with three mains for the unfiltered water, the filtered and the waste or washings respectively, which are provided with sluices of the ordinary kind used in water-works and are distinguished by being painted in different colors. Pasteur's filters, from their peculiar nature, act efficiently under any degree of pressure, whether the water pass from within outward or *vice versa*. In these the unfiltered water is admitted into the upper compartments under a head at Darjiling of sixty-five feet or twenty-eight pounds (equals two atmospheres) to the square inch, passing through the filter-tubes into the lower, whence it flows into the mains; and the thirty-eight cells or cylinders of which this installation consists are capable of supplying 150,000 gallons of perfectly sterilized water, which might be increased indefinitely by merely adding to their number. As a single defective tube would destroy the efficiency of the filters, they are tested in the first instance, and subsequently at intervals by a method based on a remarkable property of the material of which they are composed, viz., that though they are freely permeable by water, they when wet resist the passage of air through their pores, even under a pressure of one and a half atmospheres. This is done by pumping air into the lower compartments, from which the water has been run off through the small pipe attached thereto, the valve of the inlet being closed to remove the pressure in the opposite direction, when, if the pressure-gauge remains stationary at the given pressure, the filters may be considered perfect; should the gauge, on the other hand, indicate, by sinking, the existence

of any escape, the covers are raised, when the defective tube is detected by the appearance of minute bubbles of air at the site of the flaw.

For cleaning the filter a 10 per cent. solution of hydrochloric acid is injected into the upper chamber under pressure, which forces it into and through the filter-tubes, dissolving the solids and earthy salts that had been arrested in their substance, the external coatings being afterward removed by a brush and then washed down the drain by a stream of unfiltered water.

Examination of Well-waters.—DR. R. W. D. MACMARTIN CAMERON, M. O. H. for Galloway, has called attention to the risk of unmerited condemnation incurred by prematurely analyzing the water of a newly constructed well.

Again and again has he found that the first samples showed percentages of ammonia and albuminoid ammonia, which it would have been impossible to pass, while two or three months later these had fallen to one-sixth or one-eighth of the former amount. He attributes this to the fouling of the well by the urine, expectoration, etc., of the men employed in its excavation. For example, 0.54 part of free and 0.22 of albuminoid ammonia per million were found in the water of a well sunk in an ideal position at the foot of a hillside, in a clean, dry pasture; but two months later the proportions were *nil* and 0.09 respectively. In none of the analyses made after the lapse of two months only was there any such enormous reduction in the chlorine; but Dr. Cameron maintains, as the result of numerous observations, that in such casual pollution of the soil around a well, the chlorides are the last of the urinary products to enter the well and the last to disappear after the contamination has ceased.

It is the practice or fashion now to disparage shallow wells, as being *de facto* and inevitably liable to pollution; but we know enough of the distribution and functions of the nitrifying bacteria in the upper layers of the soil to see that if by a proper kerb, cover, etc., storm-waters and surface-filth are excluded, all legitimate additions of manure and other organic matters to the surrounding surface-soil will be completely mineralized long before they can reach the ground-water. It would be impossible, if it were desirable, to abolish shallow wells; but there is no excuse for the retention of that abomination, the cesspit, which by discharging, through leakage or otherwise, putrid liquids into the earth at a depth below the bacterial or " living " zone, is the cause of the pollution not only of most shallow, but of many deep wells, since no amount of percolation through the " dead " earth suffices for real purification. The " living " earth is the best of all possible filters, and with the abolition of cesspits, the direct application of excreta to the soil, and the discontinuance of the practice of accumulating dung in heaps till the adjacent and underlying soil is supersaturated with reeking filth, a properly constructed well, even of but six or eight feet in depth, should be practically free from the least risk.

Wells are indeed the natural sources of water for human use, and it is only human perversity that has marred their fair fame.

Post-scarlatinal Diphtheria.—The present state of bacteriological science forbidding us to assume either the spontaneous origin of a case of specific

infectious disease or the transformation of one specific disease into another, the medical officers of the Metropolitan Asylum Board's (Fever) Hospital have been much concerned with the problem of post-scarlatinal diphtheria; that is, of unmistakable diphtheria appearing in a patient convalescing from scarlatina, and in many instances at a period which would suggest or necessitate the occurrence of the infection within the hospital itself, a suspicion that apparently derives support from the great increase in the number of these cases that followed the admission of cases of primary diphtheria into the hospitals of the Board.

Year.	No. of cases of scarlatina.	No. of cases of post-scarlatinal diphtheria.	Incidence, per cent.	No. of diphtheria cases admitted.
1886	1,559	7	0.4	......
1887	4,342	18	0.4	......
1888	5,717	67	1.1	99
1889	3,730	102	2.7	722
1890	6,439	158	2.4	942
1891	5,442	97	1.7	1312
1892	11,333	211	1.8	2009
1893	14,832	207	1.3	2848
1894	12,636	210	1.6	3666

But this explanation will not bear examination; there had been such cases in the hospitals before the admission of diphtheria, and the opening of these institutions was in consequence of the enormously increased prevalence of diphtheria in the metropolis.

Notification did not come into force until 1890, but the deaths from diphtheria registered in London having risen from 0.09 per 1000 of population in 1877 to 0.23 in 1887, rose suddenly in 1888 to 0.30, and the attack-rate among scarlatinal children in hospitals since 1890 has in fact been not much higher than that among previously healthy children outside. Besides, in the N. E. Hospital, to which no cases of diphtheria are admitted, the wards being devoted to scarlatina exclusively, the incidence of post-scarlatinal diphtheria exhibited an identical and simultaneous rise for the years 1893, 1894, and 1895 (the hospital having been opened in 1892 only) of 0.4, 0.8, and 1.6 per cent. The increase in the number of cases of scarlatina admitted in the hospitals is no doubt due not so much to the fact of the greater prevalence of the disease in London, as to the legal removal of the stigma of pauperism formerly attaching to these institutions, with the civil disabilities it involved, which deterred respectable workingmen and tradesmen from availing themselves of them, of a growing appreciation of the advantages of hospital treatment and of the removal of first cases among the public generally, and to the passing of the Notification Act, which has led to the recognition of cases which might have escaped or evaded observation. Dr. Goodall, of the Eastern Hospital, one of our highest authorities on diphtheria, primary and secondary, is convinced that these post-scarlatinal cases differ in their nature and origin in no way from primary cases, but can invariably be referred to the presence of the Löffler bacillus in the throats of the individual patients or of other members of the family, and in some few instances of the nurses in attendance; these pre-existing cases having the

appearance of ordinary sore-throats, and in the absence of bacteriological examinations not being recognized as diphtheritic; indeed, we know from actual observations that the bacilli are often present without giving rise to any symptoms whatever. The figures for his own hospital for the five years 1891–1895 are as follows:

Year.	No. of cases of scarlatina.	No. of cases of diphtheria (mostly post-scarlatinal).	Deaths from diphtheria.	Percentage incidence of diphtheria.	Case-mortality of the diphtheria cases.
1891 .	1413	28	18	1.9	64.2
1892 .	2902	17	9	0.5	52.9
1893 .	2018	10	6	0.4	60.0
1894 .	1647	14	6	0.8	42.3
1895 .	1517	68	17	4.4	25.0

Of the 17 deaths in 1895 no fewer than 9 were due not so much to the secondary diphtheria as to some complication of the antecedent scarlatina, and would probably have ended fatally, though diphtheria had not supervened; but even including these the death-rate of 25 per cent. is less than half the mean of the preceding four years, which was 55 per cent., and this he rightly ascribes to the employment of the antitoxin treatment, which he was the first to adopt in the hospitals of the Board.

We may here refer to the observations of Dr. Caiger, another of the Board's superintendent medical officers, on the relative danger of fevers supervening on others, viz., that the mortality of such secondary attacks is far greater when the preceding disease has been one attacking the same mucous membranes or other tissues; thus varicella, usually a trifling affection, assumes, when following scarlatina or measles, the characters of smallpox, and, though post-scarlatinal is graver than primary diphtheria, an attack of diphtheria following measles is most likely to be fatal, since it finds not only the throat, but the bronchi themselves in a highly congested and susceptible condition, and is apt to involve by extension the entire respiratory tract.

The Differentiation of the Bacillus of Enteric Fever (Eberth's) from the B. Coli Communis, etc., and of Koch's Cholera-bacillus from Others of Like Morphological Character.—DR. KLEIN, in his Harben lectures, delivered this summer at King's College, London, expressed his belief that, on the one hand, in the majority of cases in which the presence of the typhoid bacillus had been alleged, the organism actually observed had been merely the B. coli; and, on the other, that little reliance could be placed on its assumed existence, since even when its presence was certain, from the proved admixture of enteric evacuations, it might easily elude detection.

The B. coli is, strictly speaking, positive evidence of fecal contamination direct or indirect, being always derived originally from the intestine of man or beast, but not of such pollution in the grosser sense that is commonly suggested by the expression. In towns and populous districts it is ubiquitous, being present in earth, air, and water, in food and drink, and even in the saliva and sweat. But it is not found on mountains and moors, and so far from its ubiquity elsewhere negativing the theory of its origin, it simply

means that the air and water are nowhere absolutely free from some slight taint.

It is the chief cause of the souring and curdling of milk, which, though sterile so long as it is in the udder, becomes inoculated in the act of milking; while milk, being the richest of culture-media, that sold in the shops teems with the bacilli by myraids in the cubic centimetre.

It was, Dr. Klein said, absolutely distinguishable from Eberth's bacillus by:

1. Its power of coagulating milk, this being due to the formation of special ferment, and not to the acid which is generated equally by Eberth's bacillus, as shown by the cultivation of either in gelatin tinted with blue litmus.

2. The evolution of gas, forming large bubbles in a solid gelatin-culture.

3. The production of indol in broth-cultures kept at a temperature of 37° C., indicated by the deep red color following the addition of a few drops of *commercial* nitric acid, this being in fact the source of the indol which is a normal constituent of the contents of the intestine. None of these properties is possessed by Eberth's bacillus, which is more slender, growing far less rapidly, and, under special staining-methods, showing numerous flagelli, the B. coli having few or none. The bubbles beautifully seen in stab-cultures are by themselves conclusive.

The detection of the bacillus of typhoid fever is extremely difficult; even in the undiluted sewage of a wing of a hospital in which were forty typhoid patients it was demonstrable in a minority only of the preparations; and though the epidemic of Worthing was indisputably due to a contaminated water-supply, none was found in 2500 c.cm. taken from the mains and only a few in 1200 c.cm. from the well itself; and the results were little better when he inoculated with pure cultures of the typhoid bacillus cultures and fluids containing B. coli, etc.

The examination of sewage-organisms may be greatly facilitated by making cultures in gelatin with 300 to 400 per cent. of phenol, which eliminates all but the B. coli, Eberth's, Proteus Zankeri, and perhaps one or two more; but under all circumstances the B. coli, originally the more numerous, multiplies with such rapidity as to crowd out wholly the more delicate organisms of typhoid. Yet the presence of a large number of the former shows such fecal pollution as to render specific contamination possible at any moment, and in this lies their chief significance.

A like difficulty, or rather danger, attends the differentiation of Koch's bacillus of cholera from Finkler's, which is present in the diarrhœas often miscalled cholera nostras, etc., if the examination be conducted in a perfunctory manner.

The most characteristic appearance of Koch's bacilli is that of chains of commas or pairs, giving the form of an S, in the flocculi of the rice-water evacuations. From these flocculi cultures are made in water with 1 per cent. of pepsin and 0.5 per cent. of common salt. Subcultures made by a stab in gelatin are easily recognized by the more rapid liquefaction of the gelatin by Finkler's, which gives a jelly-bag appearance to the track, that following a stab of Koch's presenting the appearance of a string of beads.

This distinction, depending on the different rates of growth, is analogous to that observed in the case of the B. coli and Eberth's, though the effect is in the one instance evolution of gas and in the other liquefaction of the

gelatin. To detect cholera-bacilli in water, 500 c.cm. should be mixed with a 10 per cent. solution of pepsin and 5 per cent. of salt, in such proportions that the mixture contains 1 per cent. of pepsin and 0.5 per cent. of salt.

Fluid cultures treated with a few drops of sulphuric acid absolutely free from nitrates give an indol reaction—*i. e.*, a deep red color.

Mortality from Tuberculosis in German Cities.—DR. BOLLINGER (DR. C. W. Chancellor, in *Sanitarian*, April, 1896), comparing the mortality-tables of various German cities extending over long periods, finds that in the large cities a distinct diminution in the death-rate from tuberculosis is taking place. In Munich, for example, a diminution of 18 per 10,000 has occurred during the last twenty-six years. The tuberculous material in the Pathological Institute, it is said, has diminished so that in the space of five years 8 per cent. fewer cases of tubercle are met with on the post-mortem table; formerly a third of all post-mortem examinations were on subjects that had died from tuberculosis in some form, where they now number only a fourth. He states also that in 1893-'94 a remarkable increase in tuberculosis took place in Schwerin, and this increase corresponded with a dearth of fodder, illustrating the effects of deficient nutrition in predisposing to disease.

Milk as an Aid in the Conveyance of Disease.—DR. R. G. FREEMAN (*Medical Record*, March 28, 1896) has collected and tabulated fifty-three epidemics of typhoid fever attributed to milk, twenty-six of scarlatina, eleven of diphtheria, two of foot-and-mouth disease, three of throat affection, two of acute poisoning, and one of cholera asiatica, all occurring since 1880, and including none of those tabulated by Hart in 1881. As an aid in the consideration of the manner in which milk may become infected, Dr. Freeman prepared three plates of equal size (three and a half inches in diameter) and exposed them for the same length of time (two minutes), one in the open air, one inside a barn, and the third under a cow being milked in the same barn, the plate being held just in front of the milk-pail. Six colonies developed on the first, 111 on the second, and 1800 on the third. Such a number of bacteria falling on so small a surface in so short a time indicates that an enormous number may fall into a milk-pail during the time required for a complete milking. These bacteria fall from the belly of the cow, from the clothes of the milker, and from his hands as well. Contamination may be by impure water used in washing the utensils or in cooling the milk, or, again, as an adulterant. Whatever bacteria are present in milk after the first handling have ample opportunity to multiply before the milk is consumed, since milk is usually over thirty-six hours old when it is delivered to the purchaser. Ordinary New York milk often contains from a hundred to several millions of bacteria in each drop. Dr. Freeman divides the diseases which it is believed may be conveyed by milk into three classes : 1. Those in which the pathogenic micro-organisms which are introduced into the milk are conveyed from the body of the cow, as tuberculosis, anthrax, foot-and-mouth disease, and acute enteritis. 2. Those in which the pathogenic micro-organisms are introduced from some other source during or after milking, as cholera, typhoid, scarlet fever, and diphtheria. 3. Those caused by milk containing poisonous agents developed by bacterial growth. The

disease-germs emanating from the cow may be within the udder, or the con-
tamination may occur during milking by the dropping of particles of fecal
matter from the cow, or they may come from the dust of the barn con-
taining dried particles of fecal matter or saliva of the cow. Epidemics
due to milk have certain characteristics. The cases appear suddenly,
many new cases each day, and the subsidence is equally marked a few
days after stopping the harmful milk-supply. The houses invaded are
often widely distributed and not restricted to some particular part of
the town. The houses of the rich are apt to be more seriously invaded
than those of the poor, because the poor, as a rule, use little milk. The
houses invaded often have the best hygienic surroundings. The special
milk-drinkers in each family are most liable to become affected. In more
than half of the epidemics cases of the diseases have occurred among
the handlers of the milk prior to the outbreak. A study of the reported
epidemics teaches that in cases of communicable infectious diseases inquiry
should be made into the source of the milk-supply; milk-traffic should be
separated from houses where people live; the dairy should be at least 100
feet away from the house, barn, or privy, and on a higher level, and should
have a pure water-supply of its own; nobody should be allowed to enter the
barn or dairy or handle the milk who has come in contact with a sick person,
the sickness not being positively known to be non-contagious; all persons
connected with the milk-traffic should be required to notify the authorities
on the outbreak of any disease in their respective abodes, and to abstain
from their work until permission to resume is given by the authorities noti-
fied; cities should accept milk only from daries regularly inspected, and
where all the cows have been proved by the tuberculin-test to be free from
tuberculosis; all tuberculous cows should be killed, and the premises where
they have been kept should be thoroughly disinfected; milk should not be
kept for sale or stored in any room used for sleeping or domestic purposes or
opening into the same.

THE PLAGUE.

I.

THE RECENT AND PRESENT OUTBREAKS IN HONG-KONG AND INDIA.

By Edward F. Willoughby, M.D.,

of london.

The plague, a name not likely to be superseded, bears a strong resemblance in its etiology and pathology to typhus, in the severer cases of which petechiæ, hemorrhages, and even the most characteristic phenomenon of the former disease—glandular inflammations—may be met with. It is often called bubonic plague, but inaccurately, since in a minority only, indeed, if we recognize the "pestis minor" as a "pestis metior" differing chiefly in severity, in a very small minority of cases does suppuration occur. Known to the Greek physicians, and introduced into Europe in the sixth century, if not earlier, for more than a thousand years it from time to time decimated the nations, but disappeared from Great Britain about the end of the seventeenth century, and from Western, Southern, and Central Europe toward the close of the eighteenth century; though Malta was involved in a Levantine epidemic in 1813, and it lingered on the lower Danube and the shores of the Black Sea until 1840, while Russia has been frequently, and quite recently, invaded via Astrakhan.

It is endemic in Arabia, Syria, the Euphrates Valley, Persia, Central Asia, and Southern China, whence it has within the present century made inroads along the northern coast of Africa, across the Himalayas, and into some of the islands of the far East, but has never approached the equator or crossed the oceans on either side. Like typhus, it follows wars and famines, and is favored by poverty, filth, and overcrowding;

conditions, be it remembered, by no means necessarily connoting density of population; existing, indeed, in far more aggravated degrees on the bleak steppes of Turkistan than in the populous cities of the Ganges Valley, though unknown in equatorial regions, where men can find food without labor, and clothes and houses are rather inconveniences than otherwise.

Aryans, Semites, and Mongols have suffered alike at different times, and the facts that Europeans in Asia enjoy comparative immunity, and that it has never prevailed as an epidemic in India save in years of famine, seem to point to social conditions rather than to racial differences in explanation of its geographical distribution, both in the present and in the past, unless it be true that the Japanese, the cleanest people in the world, are as susceptible as the Chinese, who are the filthiest of civilized races; but this is doubtful, since two of the three Japanese medical men who were attacked in Hong-Kong contracted it apparently by inoculation in the post-mortem room, while the Chinese hospital assistants, conforming to European habits, escaped.

Its prevalence in the Chinese province of Yunnan excited no attention; but Hong-Kong was invaded from Canton in 1894 and in 1896, and some cases occurred in Singapore and Borneo. On each occasion the incidence of the disease was mainly on the Chinese population, among whom the case-mortality in 1894 could not have been much under 100 per cent.—that among the hospital patients having been 93 per cent., and no account having been taken of the numerous dead bodies found daily in the streets. In 1896, whether from the disease being of a milder type, or, as is more probable, from better medical and sanitary measures, the total mortality among the Chinese was 89 per cent. of the persons attacked, whether in the hospitals or in their homes, but the European colony suffered more than in 1894. In that year the only Europeans attacked were the soldiers of the Shropshire Regiment, who volunteered to assist the municipal authorities in scavenging and sanitary work, in which they were exposed to the inhalation of highly infected dust; the medical and nursing staff escaped entirely, the two sisters of the Italian convent who succumbed having been Eurasians coming from very poor homes, and the three Japanese medical men, one of whom died, having been engaged in post-mortem examinations and pathological research. In 1896 the cases other than Chinamen were only twenty-two, viz., six Europeans, with four deaths; fifteen Indians, with six deaths; and one native of Siam, who died. Two of the Europeans were nursing-sisters, an English and an Italian lady, the latter dying.

As to the susceptibility of the lower animals to the plague there is some difference of opinion; but this much is certain, that while it has never been observed in cattle, jackals, dogs, and pigs are attacked after devouring corpses, which in China are often left exposed. In Hong-

Kong, on the other hand, the dogs did not suffer because the dead were promptly buried by the authorities, if not by their friends. Rats, however, are attacked in every place, not only during an epidemic, but before the disease appears among the population, so constantly indeed that in China and among the Himalayan tribes one of the names by which it is known is that of "rat's disease," and it is remarkable that the first cases in Bombay were among the coolies employed in unloading ships from China and in the granaries. How far the rats act as intermediaries or vehicles of infection, and whether they in the first contract the disease from man, or *vice versa*, are at present matters of speculation.

In endeavoring to trace the origin of an epidemic, especially of any disease which, like cholera, yellow fever, smallpox, or that under consideration, is apt to be introduced into a community from without, and in devising measures for preventing its importation or its spread, it is necessary to have an accurate conception of the means and vehicles of infection and of the incubation and infective periods.

There is no doubt that the incubation-period is short—not exceeding a week. Dr. Lowson puts it at three to six days, while Dr. Aoyama is inclined to extend the time by a day at each end. How long after recovery a patient is liable to communicate the infection to others is not, I believe, determined. As to the mode of infection, we must at once dismiss from our minds the ghastly mediæval tales of inevitable contagion and certain death, which would paralyze all human effort. Not that we need discredit them, for we see them repeated in the widespread and appalling case-mortality which still prevails whenever the plague obtains a foothold among peoples, who, whether habitually or under the stress of famine, whether in the city or desert, and in whatever climate, herd together in mud-floored hovels, reeking with filth within and without, dirty in their persons and clothes, and with insufficient, coarse and sour, or unwholesome food. The conditions of the poorer classes in the cities of Europe in the middle ages, and even in some until the beginning of the last, perhaps I might have said present, century, were little, if at all, better than those which are now met with among Arabs, Kurds, and Chinese ; but *tempora mutantur et nos mutamur in illis.* Within the last fifty years many physicians, as Drs. Bartoletti, Cabiadis, and Lowson, in Turkey, Tripoli, and Hong-Kong, respectively, have treated—nay, handled—thousands of patients with impunity, though for the most part in well-ventilated hospital-sheds ; whereas hundreds of Russian army surgeons fell victims to the typhus so called, though it was probably the plague (if, indeed, there be any essential and specific difference between these diseases), in the campaigns of 1828 and 1876 on the Danube and in Armenia, where, as in so many wars, the medical and commissariat arrangements were wholly unequal to the strain. Theories of a tainted atmosphere and of infection by the breath or by exhalations from the

bodies of the sick were satisfactory enough so long as the poison was supposed to be a subtle emanation, whether of telluric or of animal origin ; but, like the hypothesis of the "distal aërial diffusion" of small-pox, are scarcely compatible with the recognition of contagia as ponderable, particulate living bodies, requiring a liquid or moist surface for their growth, though capable of retaining their vitality when desiccated and floating in the air as dust, and to resuscitate and resume their activity when inhaled or ingested. In fact, inhalation of infected dust, handling of fomites, and "eating with" soiled and "unwashed hands," are the real and actual modes of infection commonly spoken of as aërial or by contact. Thus, while the medical men and all but four of the nurses in attendance on the sick at Hong-Kong from 1894 to 1896 escaped entirely, the victims were almost exclusively among the soldiers engaged in shovelling the filth from the floors of infected houses and in tipping it from the carts for burning ; and when the removal was not commenced until the filth had been saturated with the acid liquid used for evolving chlorine this operation ceased to be attended with danger. None of those who removed the corpses for burial, carrying them by their pigtails and feet and avoiding contact with their soiled clothing, were attacked.

I have already alluded incidentally to a mild and more chronic form of disease known as the "pestis minor," which appears to keep alive the infection and to serve as a connecting-link between the great epidemics. It is marked by the same disseminated adenitis as the typical plague, and by a certain amount of fever ; though it runs a course of indefinite duration, and, as a rule, terminates in recovery, unless, as sometimes happens, after many days or even weeks, during which the patient has perhaps been scarcely conscious of being ill, it suddenly develops into an attack of unmistakable and probably fatal plague. It is true that no such dimorphism is known in the case of the other acute specific diseases, as smallpox, scarlatina, etc. ; but I think that we have a strictly parallel phenomenon presented in the relation of farcy to glanders, in which modern pathologists recognize but a chronic and an acute form of one and the same disease, the identical bacillus being present in each ; and since the discovery by Kitasato of the specific bacillus of the plague in the acute cases at Hong-Kong two years ago, it has been identified by several observers in cases of the minor or chronic disease, though apparently attenuated and of less toxicity. This discovery is of the utmost interest and importance, serving to explain the recent instances of the introduction of the plague into Calcutta, and still more the occurrence of two cases on board vessels in the Thames, for which one must otherwise have had recourse to conjectural fomites, or to the unwarrantable hypothesis of an extraordinarily prolonged incubation. This dimorphism, as I have termed it, is, of course, a

wholly different phenomenon from that of the mild and unrecognized cases of cholera, diphtheria, and scarlatina, which frequently usher in an epidemic of these diseases, arousing no suspicion of the danger until it is too late to avert it, and baffling endeavors to trace the disease to its origin. But long ago, on purely clinical and etiological grounds, Foderé at Marseilles in 1820, Tholazon in Persia in the sixties, Dickson in Bagdad, and others more recently recognized the connection, Foderé expressing the decided opinion that the pestis minor, benign and non-fatal though it was, "was not less the plague and no less merited the attention of physicians and of magistrates," a position now confirmed by bacteriology and clinical observation.

The first official announcement of the appearance of the plague in Bombay was at the meeting of the sanitary committee on September 23d, when Dr. Viegas stated that it had been present in the city for a fortnight; but it must have been recognized by the native population for two or three months, since pilgrimages to propitiate the goddess of this disease had been organized in the Maudvie, a suburb inhabited by the poorest class. Bombay is in every respect the very opposite of Hong-Kong, which is built on a lofty granite rock, with an unimpeachable water-supply, and in the European quarters a separate system of sewerage with steep gradients, being, in fact, a model of sanitary perfection. There not only the European civil population but their Chinese servants enjoyed absolute immunity. Bombay, on the other hand, lies low, the sewers are defective, with insufficient fall, the soil is sewage-sodden, and the city surrounded by swamps. In November the disease, which had seemed to be abating, revived and the mortality steadily rose; but the official returns, which gave the total deaths up to the middle of January as 2500, are certainly grossly below the truth. Segregation of infected houses and persons was tried, and relaxed or abandoned by turns, and, as might have been expected, with little or no success, seeing that a "house" in the poorer native quarters contains three hundred to six hundred or even more occupants. The fears and prejudices of the people led them to conceal the existence of the disease, while the native medical men, and even the European, yielding to the entreaties of the friends, certified the deaths as "remittent fever," "pneumonia," etc. That in December fifty deaths occurred daily from remittent fever in an urban population is utterly incredible, or that, in the absence of any epidemic of cholera or other disease than the plague, the general death-rate of the city should have risen to between four and five times its normal figure, save from this one cause, is inconceivable. Nor have the Europeans escaped, several deaths having already occurred not only among medical officers, but among civilians. A general exodus of the native population threatens to spread the plague throughout the famine-stricken provinces, and already several hundred deaths

have been reported from Karachi, the second largest seaport on the west coast, and a considerable number at Poonah, which is usually deemed a very healthy station; while "sporadic" cases are cropping up on all sides. From Calcutta conflicting accounts are received; since the arrival last October of a case of pestis minor (?) from Bombay, which shortly assumed a typical character, many have been reported, either as plague or *bubon d'emblée*, or under other more or less equivocal denominations. The bacillus of the plague has been identified in several of these; but the disease is at any rate of a milder type, and with a far lower mortality than at Bombay. The men of the Shropshire Regiment which did such noble service at Hong-Kong, and is at present stationed at Calcutta, have suffered extensively from non-venereal buboes. The sanitary conditions of Calcutta, especially in the native quarter, are even worse than those of Bombay, so that the outlook is grave in the extreme should the disease assume a severer character. The approaching pilgrimage of devout Mussulmans to Mecca and other holy places is calculated to give cause for serious alarm as to the propagation of the epidemic not only in Arabia, Persia, and the Euphrates Valley, but its subsequent conveyance onward by Mohammedan pilgrims from the Levant, Algeria, Southern Russia, and Bosnia, returning to their homes on the shores of the Mediterranean and Black Sea and the valley of the Danube; the more so, as ten cases have already been detected in the port of Marseilles.

II.

ITS GERM AND TRANSMISSION.

By Alvah H. Doty, M.D.,
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The appearance of the bubonic plague in the East during the past two years finds the world, for the first time, prepared to investigate scientifically the cause of its development and indicate the means of relief. The investigations undertaken have already in a measure been successful, and the value of the results will be better appreciated after reviewing the past history of the plague, which shows the complete helplessness heretofore of the people and the authorities to restrict its ravages.

There is no doubt as to the antiquity of the bubonic plague, which has during the past two thousand years been variously described by writers under the name of Levantine, Oriental, or Bubonic Plague, and the Black Plague or Black Death, etc. These designations are open to criticism, as they are more or less misleading and without scientific foundation. Different names have been suggested by the more recent writers; malignant polyadenitis has recently been presented by Dr. Cantlie, of

London. This at least has the merit of indicating the local manifestation of the affection.

The first authentic description of the bubonic plague is contained in the writings of Rufus, of Ephesus, who described the disease as having existed in Northern Africa during the third or fourth century B. C., and presented the testimony of physicians of this period to corroborate his statements.

It is evident that Egypt was considered the home of the plague. During the reign of Justinian, in the year 542 A. D., the disease appeared in Egypt, and within a year extended to Constantinople, where it is said to have caused the death of 10,000 persons in one day. Within a short period it appeared in Italy and Gaul. It is fair to assume that the numerous "pestilences" which are referred to by Bede as occurring in England between the years 660 and 680 were epidemics of bubonic plague. Although the plague appeared in the centuries which followed the above dates, the next great outbreak which has been carefully described occurred in the fourteenth century, and was known as the " black plague " or " black death." It is hard to conceive of the terrible ravages caused by the plague during this time. It was brought from the East, and was supposed to have had its origin in China in 1334 ; thence it invaded India, Persia, Russia, and subsequently Poland, Germany, France, Italy, and Spain. It was believed by some writers of that day to have been introduced into Europe by the survivors of an expedition who landed at Genoa from the Crimea, a number of the party having died during the passage from a disease which was regarded as the plague. The disease appeared in Sicily in 1346; in England in 1349; and in Norway in 1351. Nearly the whole of Europe was invaded by this epidemic. In 1352 Oxford lost two-thirds of its academical population. It is estimated by Hecker that one-fourth of the population of Europe, or 25,000,000 persons, died of the plague during this reign of terror ; 50,000 died in Paris ; and out of 2,000,000 inhabitants in Norway but 300,000 survived. The same appalling results followed its appearance in London, Venice, and other cities of Europe. It was estimated by Pope Clement VI. that the mortality from the "black death " for the entire world was over 40,000,000. This outbreak lasted about twenty years. The plague again appeared in Europe during the fifteenth and sixteenth centuries. During the latter period (sixteenth century) China was almost depopulated. In 1656 the plague appeared in Naples, and in five months caused 300,000 deaths. During the same time the mortality in Rome was but 1400. This is of interest, inasmuch as the reduced mortality in the latter city was attributed to the sanitary precautions taken by Cardinal Gastaldi.

The great plague of London made its appearance in 1664, and lasted about one year. During this period there were 63,596 deaths

out of a population of 460,000. Hodges believed that the infection causing this outbreak was introduced by bales of merchandise from the Levant. The sanitary condition of London at this time was notoriously bad. It is a significant fact that those who lived out of town, on barges and ships in the river Thames, at this time, did not contract the disease. The outbreak was particularly destructive to the lower classes, and was known as the "Poor's Plague." Dr. George Thompson, a London physician, is said to have contracted the disease in the dissecting-room, although it is recorded that numerous post-mortems made during this period were without danger to the surgeon. No epidemic of plague appeared in London after 1666, although occasional cases were reported until 1679. In 1666 the disease invaded Cologne, and districts along the Rhine; and extended to the Netherlands in 1667–'69. It reappeared in France in 1720. In the period between 1675 and 1684 a new epidemic traversed the north of Africa and extended to Turkey, Poland, Hungary, Austria, and Germany, and then progressed northward. In 1679 there were 76,000 deaths in Vienna, and in 1681 Prague lost 83,000 of its population from the same cause.

During the eighteenth century the plague existed only in Eastern Europe, Asia, and Africa. Within this period it visited Constantinople several times with more or less disastrous effect. In 1720 a serious outbreak occurred in Marseilles and lasted until the end of 1721. It is estimated that it caused 46,000 deaths. The introduction of the disease into Marseilles was said to have been due to the arrival of a ship from Syria, where the disease prevailed. A severe epidemic occurred during the Russo-Turkish War in 1770 and in 1771. The Moscow epidemic was one of the most destructive of modern times; about 25 per cent. of the population of that city succumbed to the disease. During the end of the eighteenth and the beginning of the nineteenth century twenty-one outbreaks of the plague occurred in Egypt. Severe epidemics occurred in Constantinople during the early part of the present century. It appeared in Armenia a number of times between 1828 and 1843. The outbreaks which took place in Malta in 1813 and in Corfu in 1815 were probably due to the infection brought from the East. In 1828 an epidemic occurred in Greece, which is understood to have been introduced by troops coming from Egypt. With the exception of a slight outbreak in Dalmatia in 1840, and a severe one on the Volga, in the province of Astrakan in Russia, in 1878 and 1879, the disease has not again appeared on the continent of Europe, nor has it appeared in Egypt since 1845. Between 1853 and 1879 the plague appeared several times in Arabia, and in 1878 was within a short distance from Mecca. In 1858 a small outbreak occurred in Tripoli, at which place it reappeared in 1859 and 1873, but did not spread.

In 1867 the plague appeared in Mesopotamia (Irak) and prevailed

at intervals until 1885. A severe epidemic occurred in 1873 in this vicinity, and in 1874 it appeared further south at Divanieh. In 1876 it travelled northward and appeared at Bagdad; in 1877 it appeared at Shuster in Southwestern Persia, having been conveyed to this place by pilgrims returning from Irak.

In 1815 the plague appeared in India, showing itself in the provinces of Gujerat, Kattywar, and Cutch, "after three years of famine." During the next year it travelled to the northwest and broke out in Sind, and afterward extended in a southerly direction, but disappeared about 1820. However, it reappeared in 1836 in a severe epidemic at Pali in Marwar in Rajputana and lasted until the following year, 1837. Since then it has not appeared in this part of India.

In 1823 the disease broke out southwest of the Himalayas, and other outbreaks occurred in this vicinity in 1834, 1836, 1849, 1850, and in 1852, and also in 1856 and 1877.

In China the plague has been endemic in the provinces of Pakhoi and Lienchu since 1871. From these localities it was transplanted to Canton and Hong-Kong in 1894. The mortality in the former place was 180,000. It was during this epidemic that the French physician Yersin and the Japanese physician Kitasato made their bacteriological researches, which constitute the only scientific information we possess regarding the bubonic plague.

BACILLUS OF THE BUBONIC PLAGUE. The bacillus of the bubonic plague (*bacillus pestis bubonicæ*) was discovered and studied by Kitasato and Yersin, working independently at about the same time (1894), during the epidemic of the plague at Hong-Kong. It is found in large numbers in the pus from the buboes characteristic of this disease, in the lymphatic glands, and occasionally in the internal organs. It is apparently present in the blood only in acute hemorrhagic types of the disease and shortly before death. It has been isolated from these parts in human beings suffering from the disease; has been cultivated on artificial media; and a disease resembling it in all particulars has been produced in animals by inoculation with the cultures. Further, the organism has not been found in any other infectious disease, and it may be, therefore, fairly assumed that the bubonic plague is produced by this specific bacillus. It is pathogenic in many animals, and during epidemics rats, mice, and flies in large numbers become infected and die, and the disease is apparently transmitted through them. It has also been found in the feces, in the dust of infected houses, and in the soil.

The bacillus occurs in the form of short, thick rods, rounded at the ends, somewhat motile, and occasionally in chains, often surrounded by a capsule. It stains well with the aniline-dyes, the ends being more deeply colored than the central portion. It does not form spores, and grows abundantly upon blood-serum at the body-temperature, the

FIG. 1.
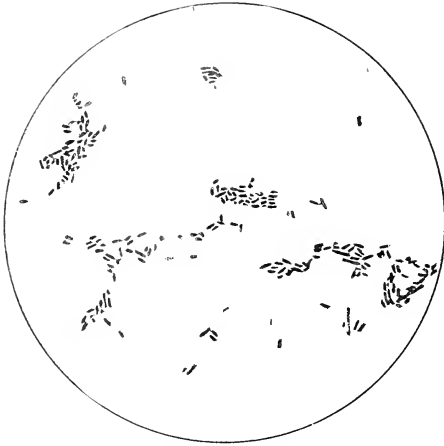
Bubonic plague bacillus. Agar culture. × 1000.

FIG. 2.
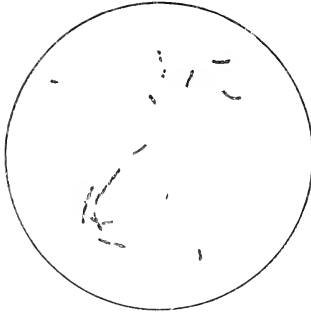
Bubonic plague bacillus. Bouillon culture. × 1000.

FIG. 3.
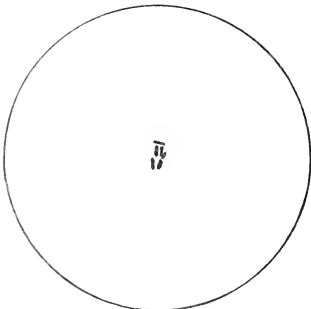
FIG. 4.
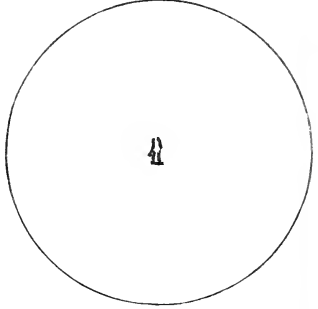
Bubonic plague bacillus. Bouillon culture. × 1000.

growth appearing on the surface after twenty-four to forty-eight hours, in the form of white, moist, transparent, and iridescent colonies. On gelatin it grows slowly along the track of the wire in stab-cultures, and on the surface of the medium at a temperature of 18° to 20° C. It grows rapidly on glycerin-agar, forming a grayish-white surface-growth. In bouillon a very characteristic appearance is produced, resembling that seen in cultures of the streptococcus of erysipelas—that is, the culture-medium appears clear with white granular or grumous deposits on the walls and in the bottom of the tube. This bacillus is pathogenic for rats, mice, guinea-pigs, and rabbits, which usually die within two or three days after inoculation. Then at the point of inoculation are found a somewhat hemorrhagic infiltration and œdema, with enlargement of the neighboring lymph-glands, hemorrhages into the peritoneal cavity, and congestion of the parenchymatous organs. The spleen sometimes shows minute nodules resembling miliary tubercles. Microscopically the bacilli are found in all the organs and in the blood. The disease is rapidly communicated from one animal to another, and thus its extension is facilitated.

The virulence of the bacilli in cultures and in nature seems to vary considerably, and is rather rapidly lost when grown on artificial media. The growth in cultures becomes more abundant after frequent transplantation. The virulence of the organism is increased by successive inoculation in certain animal species, and then its pathogenic properties for other species are less marked.

THE ANTI-PLAGUE SERUM. Yersin, Calmette, and Borrell (*Annales de l'Institut Pasteur*, 1895) succeeded in immunizing animals against the bacillus of bubonic plague by the repeated intravenous or intraperitoneal injection of dead cultures or by subcutaneous inoculation. They also succeeded in immunizing a horse in about six weeks; so that the serum afforded protection to small animals after subcutaneous injection of virulent cultures, and even cured those which had been previously infected, if administered within twelve hours after the inoculation.

A more recent report (*Bull. de l'Acad. de Méd.*, 1896) shows that Yersin has successfully applied the same treatment to man for the cure of the plague.

The first case treated was a young Chinaman at the Catholic Mission at Canton, June 26, 1896, who was attacked with a severe type of the disease. He received three injections of the serum (10 c.cm. each) and recovered. The Consul-General of France at Canton telegraphed June 29th to the Minister of Foreign Affairs thus: "I have the honor to inform your excellency that Dr. Yersin has applied his serum to a Catholic Chinaman severely ill of the plague. Absolute success."

Dr. Monod, Director of Public Health in Paris, September, 1896, presented the following communication to the Academy of Medicine:

"After Dr. Yersin's departure from Canton the French Consul at Hong Kong, M. Chausse, performed the same operation upon two other pupils at the Mission who had the plague, and cured them. Having been informed that there were many cases of plague at Amoy, Dr. Yersin went thither on July 2d. He remained there ten days, during which time he treated twenty-two cases by subcutaneous injection of serum prepared in the Pasteur Institute in Paris, and cured twenty of them. If these statements are true, it may be accepted that the value of Dr. Yerson's serum is assured."

It is believed that the plague is transmitted solely through infection from previous cases. What part, if any, the soil plays in propagating the disease has not yet been settled. The natives of Eastern countries where the plague is prevalent are strongly impressed with the belief that the germ is contained in the ground. If this view is confirmed, it may in a measure explain why the infection of rats, etc., precedes or is present during an outbreak in the human being. The constancy with which this occurs deserves more than a passing notice. There is very little doubt that the bacillus discovered by Kitasato and Yersin is found in all cases of the disease in rats occurring during an epidemic of the plague. The rats are, as a rule, stricken before the inmates of the house are affected, and are frequently found dead in the different apartments. Their presence in the interior is regarded as a bad omen—a precursor of the disease. Dr. Cantlie discusses this matter in a very able article published in the London *Lancet* of January 9, 1897. Other animals, such as the pig and dog, are similarly affected, but not to the same extent as rats. Purely herbivorous animals are not attacked.

Exactly what influence climate and temperature have in the propagation of the plague, we do not know. We do know, however, that hot, dry air is fatal to the disease, and that moist, warm air is favorable to it. It even may be very active in cold weather; this was shown in the outbreak which occurred on the Volga in the severe winter of 1878. Like typhus fever, it is unknown in the tropics, and, like this disease, it usually selects its victims from the lowest class and thrives on filth and famine.

INCUBATION. From three to six days may be regarded as the period of incubation; the time rarely, if ever, extends beyond this. In malignant cases the disease may show itself within twenty-four hours after the exposure.

SYMPTOMS. The bubonic plague may assume a mild character (pestes minor) and not seriously interfere with the daily occupation of the patient, and may continue over a period of two or three weeks or longer. A slight rise of temperature is noticeable, associated with a swelling of the glands, principally in the groin and armpit, which may or may not suppurate. Cases of this variety almost always recover. The course which this form runs is so mild that its identity with the typical form

of bubonic plague has been questioned. However, recent investigations have shown the identity of the two forms.

In the usual or severe form (pestes major) the early symptoms are similar to those which usher in typhus fever: the invasion being abrupt, associated with chills, great depression, blunted condition of the intellect, pains in the bones, high fever, etc. In rapidly fatal cases the glandular swellings may not occur. In the ordinary cases, however, they are almost always present, occurring principally in the groin and axilla, and occasionally in the neck and other regions. In some outbreaks carbuncles have been found in 2 or 3 per cent. of the cases; hemorrhages from the respiratory and alimentary tracts occur.

Hemorrhage from the respiratory or alimentary tract and petechial or hemorrhagic spots on the skin are looked upon as infallible signs of approaching death. The mortality varies in different epidemics, and is variously estimated at from 50 to 90 per cent. The disease, as it existed in Hong-Kong in 1894, when Yersin made his researches, is said by him to have presented all the symptoms and clinical features of the plague of the middle ages, and is thus described by him: "Onset abrupt; after an incubation of from four and one-half to six days, accompanied by weakness and prostration, the attack comes on suddenly with high fever, frequently attended by delirium. From the first day a specific bubo, unique in appearance, is observed in 75 per cent. of the cases in the groin, in 10 per cent. in the armpit, rarely on the neck or in other parts of the body. The lymph-glands rapidly enlarge to the size of a hen's egg. Death frequently occurs within forty-eight hours, and often earlier. When life is prolonged for five or six days the prognosis is more favorable: the bubo softens, and it may be operated on to allow the pus to escape. In some cases the bubo has not time to form; then hemorrhages take place into the mucous surfaces, or petechiæ appear on the skin. The mortality is enormous—95 per cent. in the hospitals."

It seems strange that a reappearance of the disease, which since the beginning of the Christian era has been so terribly destructive to human life, should be regarded with such apathy by the European powers as to allow it to gain its present headway in India. It is evident that the lesson taught by the ravages of previous epidemics has been unheeded. It is only within the past few weeks that any semblance of concerted action has been taken to stamp out the plague. What progress it may yet make in the East, or what probability exists of the disease reaching Europe overland, cannot be determined, and depends largely on the action of the sanitary authorities abroad. Of the numerous avenues by which the plague may reach Europe, the Suez Canal is one of the most important, and it is fortunate that the Egyptian government has a well-appointed sanitary station on this route; in fact, there are two, one at El Tor, on the southern coast of the Isthmus of Suez opposite and below

the town of Suez, and one at Suez, the entrance of the canal. At the former place provision is made for the reception of a large number of persons either sick or held for observation, with apparatus for disinfection by steam, etc. All vessels arriving at this place are inspected and detained if any evidence of infection is present. After release from this point the vessel is again examined at Suez, and, if found to be in good condition, is allowed to pass through the canal. The distance from Bombay or other Indian ports is so great that the longest possible period of incubation of the plague would be more than covered during the passage between these places. It is, therefore, evident that an infected person embarking at Bombay would develop the disease long before reaching El Tor. It is to be hoped that the present quarantine regulations of the Egyptian government will include the thorough disinfection of all ships, clothing of passengers, bedding, etc., which arrive from India, whether cases of illness have occurred on board or not. This would prevent the carrying of infected material to European ports, and, if effectively carried out, would render valuable aid in preventing the introduction of the plague into Europe by water.

The short period of incubation in this disease is also one of our great safeguards, as the time occupied in a passage to this country from a Mediterranean port would more than cover the period of incubation. This might also be said in regard to the passage from any European port. If an outbreak of this disease should occur on shipboard during the voyage, it would be made known to the quarantine officer on the arrival of the ship, which would be held for disinfection, the passengers and crew being treated as the occasion demands. There remains, however, an element of danger which unfortunately cannot very well be estimated, as our knowledge on this is meagre and unsatisfactory. I refer to the transmission of the disease by clothing, articles of merchandise, etc. It is this possibility which confronts the health officials, and constitutes a difficult and unpleasant problem. In view of the uncertainty which exists regarding the latter, it would seem imperative that every precaution should be taken to disinfect carefully and properly every piece of material which may be regarded as a menace to health.

With the improved and effective forms of apparatus for disinfection by heat which are now available, and the good results which are being obtained from the use of formaldehyd, no infected materials should gain entrance to this country, as no port of entry should be without the proper equipment for the treatment of possibly infected matter.

III.

ITS TREATMENT AND PREVENTION.

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Our modern knowledge of plague is due chiefly to the efforts and writings of Kitasato, Aoyama, Yersin, Wilm, Cantlie, Lowson, and Arnold.

Kitasato and Aoyama, with assistants, were commissioned by the Japanese Government to study the plague in Hong-Kong in 1894— Kitasato to make bacteriological investigation, and Aoyama to report upon the clinical and pathological characteristics of the plague.

Kitasato discovered the plague-bacillus, and first published the results of his investigations under the auspices of the University of Tokio, July 7, 1894. His report was reproduced in the *British Medical Journal*, and may also be found in full in the *Annual Report of the Marine-Hospital Service* for 1894.

Aoyama published his report in the *Mittheilungen aus der Medicinischen Facultat der Kaiserlich—Japanischen Universitat*, Tokio, June, 1895.

Yersin was commissioned by the French Minister for the Colonies to investigate the plague at Hong-Kong, and conducted his researches in 1894, both in Hong-Kong and Canton. The results were published in the *Annals of the Pasteur Institute*, September, 1894.

A second article in the *Annals of the Pasteur Institute*, July, 1895, was published jointly by Yersin, Calmette, and Borrel as the result of investigations in the laboratory of Roux in the Pasteur Institute. This article relates chiefly to the study of the toxins and the serum-therapy of the disease.

In January, 1896, Yersin, under the auspices of the French Government, returned to Annam (Cochin-China), and established there (at Nha Trang) a Pasteur Institute for the investigation of the disease.

In June, the same year, he proceeded to Canton, where he treated successfully a case of plague with serum brought from the Pasteur Institute at Nha Trang, this being the first case of plague subjected to the serum-therapy. He then proceeded to Amoy, where he treated twenty-three cases of plague, with twenty-one recoveries, with serum brought from the Pasteur Institute in Paris. The details of the above work are published in a third article by Yersin in the *Annals of the Pasteur Institute*, January 25, 1897.

Dr. Wilm, a surgeon of the German navy, was commissioned by his government to make an investigation of the pest in Hong-Kong during the epidemic in 1895, and made report thereon May 20, 1896.

Cantlie (lecturer on applied anatomy, Charing Cross Hospital Medical School, late of Hong-Kong) had opportunity for studying and recording the disease during the Hong-Kong epidemic, and a very complete lecture thereon is published in the London *Lancet* of January 2 and 9, 1897.

James A. Lowson, medical officer in charge of the Epidemic Hospital in Hong-Kong, has made a full report upon the epidemic of 1894, published by Noronha & Co., Government printers, Hong-Kong, 1895.

W. F. Arnold, Passed-Assistant Surgeon, U. S. Navy, studied the plague during its exacerbation in Hong-Kong in 1896. A preliminary report is published in the *Annual Report of the Surgeon-General of the U. S. Navy* for 1896. It is to this observer that we are indebted for the cultures which form the basis of the experiments now being conducted in three laboratories in the United States.

DEFINITION. Plague, or malignant polyadenitis, is an acute febrile disease, of an intensely fatal nature, characterized by inflammation of the lymphatic glands, marked cerebral and vascular disturbances, and by the presence of a specific bacillus. Although one gland alone may be clinically apparent, most, if not all, of the lymphatic glands are found to be enlarged at the post-mortem examinations. (Cantlie.)

PERIOD OF INCUBATION. Three to five days, possibly eight (Kitasato); four and one-half to six days (Yersin); two to seven days (Aoyama); three to six days (Cantlie); may reach nine days (Lowson). Cantlie adds: " I do not think that we have evidence to place the period of incubation of malignant polyadenitis beyond the end of the sixth day after exposure. Be it observed, however, this extends only to plague-infection during an epidemic. The evidence to hand the last few weeks from Calcutta and from London renders the period of incubation of ambulatory plague uncertain."

SYMPTOMS AND DURATION OF THE DISEASE. " The patient complains of high fever and swelling of one or more of the lymphatic glands. These swellings may antedate, coincide with, or follow the rise in temperature, and are accompanied by severe pain. The most common gland affected is one of the femoral chain, next an inguinal, next axillary, and sometimes a cervical gland is affected. The tongue is coated with a grayish-white or dark-brown heavy fur. There is commonly headache, also delirium; the heart is generally affected; occasionally vomiting and diarrhœa are present (not frequently the last two conditions, which are generally forerunners of a fatal issue).

"In patients who survive the onset of the disease the temperature does not fall until a week has passed, and convalescence is a slow process.

" Sex and age make no difference in the disease; men and women, infants and old people, are attacked equally.

" If in such a case as described the blood be examined, the before-described bacilli, in greater or less numbers, will be found present.

" It is not always an easy matter to demonstrate the presence of the bacilli directly in the blood of many patients; they are present sometimes in such small numerical strength that only after examining several slides can they be discovered. In order to be safe, not only must the blood of a suspected plague-patient be examined, but a cultivation should also be made.

" In the buboes the bacilli always occur in the form of pure cultivations, but it is obviously not always easy to procure a specimen of bubo-contents from the living subject." (Kitasato.)

" When prodromal symptoms occur they generally last not more than two hours, and include lassitude, headache and malaise, vomiting, loss of appetite, dizziness, pain in the limbs, gland-swelling. The temperature soon reaches 39° or 40° C., or even higher, and continues high.

" Delirium occurs very early in the attack. It is seldom violent. The face is at first very red. Pulse strong, tense, and dicrotic. Urine dark red and frequently albuminous.

" The gland-affection occurs as the fever begins to rise; the swelling progresses rapidly, and in two days reaches the size of an egg. The pain is often so intense as to extort cries of anguish from the patient. At other times the swelling can only be detected by pressure, and is not painful. The swelling disperses or gathers in a huge collection of pus. Dispersion is slow, and often the swelling is perceptible for two months.

" The period of recovery begins usually with the end of the first or the beginning of the second week. Complications are numerous, namely, nephritis, abscesses, retention of urine, icterus, carbuncle, etc."

" Death usually occurs at the height of the disease, and between the second and eighth day. Intermissions in the fever do occur. (Lowson.) Death seldom occurs later than between the second and eighth day." (Aoyama.)

Yersin describes the course of the disease as follows: overwhelming prostration. The patient is suddenly seized with a high fever, accompanied by delirium. After the first day a bubo, usually single, appears. In 75 per cent. of the cases this bubo was in the groin, in 10 per cent. in the axilla—rarely in the neck or other regions. The gland affected quickly attains the size of a hen's egg. Death supervenes at the end of forty-eight hours, and frequently sooner. When life is prolonged for five or six days the prognosis is better. The gland then softens, and we may then operate and evacuate the pus. In many cases the bubo has not time to form, and then we have hemorrhages from the mucous membranes and petechial spots on the skin. The mortality is very large.

Wilm states that in one to five or six days after the fever begins the glands begin to swell. The duration of the fever is usually from a few hours to some weeks. In about 30 per cent. of the recorded cases the

fever of the infection lasted about five or six days, and this may be regarded as typical. It is high at the beginning and sinks slowly, with frequent returning remissions. It may last as long as ten days. After this primary fever a secondary fever occurs in a majority of recovering cases. This is the "fever of absorption," and may lead to weeks of exhausting illness, and cases may die at this stage which were saved in the battle of infection.

As to the swollen glands, Wilm says: even large buboes may form in a few hours after a time when a person has felt absolutely in the best of health. On the other hand, we frequently see a patient dying of plague without being able to feel a single affected gland, and only a thorough post-mortem examination shows the slightly swollen glands of lentil, pea, or almond size, which yield the plague-bacillus by micro-scope and culture-tube." 76 per cent. of Wilm's observed recorded cases died in the first six days. Death was generally caused by paral-ysis of the heart; in other cases it was from the brain-complication (meningitis, cerebritis, and hemorrhage). The temperature at death is sometimes very high; sometimes subnormal. Convalescence is generally prolonged and often complicated with suppurative fever.

DEATH-RATE. (From official reports, Hong-Kong, 1894—Lowson.) Chinese, 93.4 per cent.; Indians, 77 per cent.; Japanese, 60 per cent.; Eurasians, 100 per cent.; Europeans, 18.2 per cent. Lowson adds: "No doubt the European blood and stamina had a good deal to do with the recovery—this, notwithstanding the more careful nursing they received. Early treatment and confidence in the European medical attendant were also in their favor."

TREATMENT. According to Tyson, free stimulation, nutritious food, together with cool baths to combat the fever, are the measures indicated. Antiseptic treatment of the abscesses should be practised, and may shorten the duration of these plagues of the skin as compared with the older treatment.

Kitasato's general directions relate to hygienic measures: proper re-ceptacles for sewerage, purity of water-supply, isolation of the sick, dis-infection of clothing and bedding and of the evacuations, all contact with the sick to be avoided, great care to be exercised with regard to food and drink, and after recovery the patient to be kept in isolation at least for a month.

Lowson advises: "Never use depressants if you can possibly do with-out them;" and states that brandy and tepid sponging were without doubt the best antipyretics.

The serum-therapy, as demonstrated by Yersin, is highly efficacious. Thirty cubic centimetres of the serum from an immunized horse cured the first severe case of plague upon which it was tried. Yersin in ten days, in Amoy, treated twenty-three cases of plague. Almost all of

them were treated in Chinese houses under bad sanitary conditions. His results were as follows:

Six plague-cases taken on the first day of the disease. Cure obtained in all in from twelve to twenty-four hours, without suppuration of the bubo, by injection of from 20 to 30 c.cm. of serum.

Six taken on second day. Cure slower; 30 to 50 c.cm. of serum used. Complete cure without suppuration in three or four days.

Four taken on third day. Fever persisted one or two days after commencement of injections. Cure was slower and in two cases the buboes suppurated; 40 to 60 c.cm. used.

Three taken on fourth day. Cured in five or six days. One bubo suppurated. Serum injected, 20 to 50 c.cm.

Four taken on fifth day. Two died whose cases were desperate from the outset. Serum used, 60 to 90 c.cm.

To the date of Yersin's report 26 plague-cases had been treated with serum—3 at Canton, 23 at Amoy. Of these only two died.

VARIETIES OF THE DISEASE. The preceding compilation relates to "malignant polyadenitis," which embraces both forms of plague known as "fulminant" and "typical."

According to Cantlie, the varieties of plague are (a) fulminant, (b) typical, (c) pestis minor, and they are all allied. He suggests that an appropriate name for the fulminant and typical plague is "malignant polyadenitis," and an appropriate name for the mild variety (pestis minor) "benignant polyadenitis." A benign polyadenitis, according to Cantlie, may run its course without being preceded or followed by the malignant variety, and the malignant polyadenitis may run its course without being preceded or followed by the benign variety, yet typical plague—malignant polyadenitis—is frequently associated with pestis minor—benign polyadenitis. A bacillus of somewhat similar appearance microscopically is reputed to be found in both. The cause of fulminant and typical plague is a diplo-bacterium in the blood and tissues. The cause of pestis minor, or benignant polyadenitis, may be an allied diplo-bacterium, but with less toxic power.

Pestis minor, until within a short time, according to Cantlie, was considered a disease of wholly different nature from that of true plague. Recently, however, news has been received from Calcutta of the discovery of a bacillus allied to the Kitasato bacillus of true plague, and associated with the variety of plague known as pestis minor. In this disease the temperature is rarely high, although it has been known to be 104° F. The duration is from ten to twenty days usually, but may be eight weeks, for most of which time the general health is but little impaired and the patient able to go about as usual. It may be observed here that the true relation of pestis minor to the true plague has not been satisfactorily determined. Cantlie concludes that a pestis ambulans

may become a malignant polyadenitis in the same person, even although
the patient is removed from the infected zone, and that the period of
incubation of ambulatory plague is uncertain. This is based upon the
history of the case of a lad seventeen years of age, who had been exposed
to plague in Bombay, and fifteen days before leaving Bombay for Cal-
cutta had noticed swellings first in one groin and then in another, but
never felt ill until his arrival in Calcutta. He was examined, and a
diplo-bacterium identical with the Kitasato bacillus was found in his
blood, and the clinical symptoms of plague were manifest. It is an
unpleasant reflection that a person may be infected with plague fifteen
or twenty days without feeling any inconvenience, but at the expiration
of that time have the disease appear in its virulent form.

PLAGUE-BACILLUS. As the report of Kitasato published in English
is readily available, and inasmuch as I have seen no translation of the
article of Yersin, the limits of this paper preventing the observations of
both writers, I insert here a translation of Yersin's description of the
bacillus, taken from the *Annals of the Pasteur Institute*, September, 1894 :

" The first indication was to see if a microbe existed in the blood and
in the pulp of the buboes of those sick with the disease. The pulp of
the buboes is filled in all cases with a veritable purée of a short, non-
motile bacillus, with rounded ends, staining easily with the ordinary
aniline-dyes, but not staining with Gram's method. The poles of the
bacillus are stained more deeply than the centre, so that often a clear
space is seen in the middle of the rod. Sometimes the bacillus appears
to be surrounded by a capsule. It is found in great numbers in all the
buboes and glands of patients. The blood also contains it sometimes,
but in much smaller numbers ; it is there only in very grave cases and
those rapidly fatal.

" The pulp of the buboes planted upon gelatin gives rise to the de-
velopment of white transparent colonies, presenting iridescent margins
when viewed by reflected light. Culture is best made in glycerin-agar.
The bacillus also grows upon coagulated blood-serum. In bouillon the
growth presents a very characteristic appearance, quite similar to that
of erysipelas—a clear liquid with grumous deposits along the walls and
at the bottom of the tube. An alkaline solution of peptone, 2 per
cent., with the addition of 1 to 2 per cent. of gelatin, is the most favor-
able medium. These cultures examined under the microscope show true
chains of bacilli ; sometimes presenting bulbous enlargements. Upon
the gelatin, if we examine with great care and with a high magnifica-
tion, we find among the normal forms bacilli sometimes deformed and
sometimes chains formed of rods disposed laterally. These deformed
and abnormal forms become more and more numerous in old cultures,
and they stain but poorly."

According to Zettnor and Koch, as quoted in the London *Lancet*,

February 6th, the bacillus is a "bacillus asporigenus," which dies after four days, during which it is kept at a dry heat, or at the temperature of 80° C. for half an hour, or at that of 100° C. for a few minutes. Its resisting power to chemical disinfectants is feeble, succumbing shortly in a 1 per cent. solution of carbolic acid or of lime-water. On the other hand, it develops easily in many culture-media at the ordinary temperature (from 18° to 22° C.), having been found in the soil and in the dust of houses where those ill from it, or who have died from it, have been lodged.

DISINFECTION-EXPERIMENTS UPON THE BACILLUS OF BUBONIC PLAGUE.

	5 minutes.	10 minutes.	15 minutes.	30 minutes.
Formaldehyd :				
1 : 1000	No growth.	No growth.	No growth.	
1 : 2000	Growth.	Growth.	No growth.	
1 : 3000	Growth.	Growth.	Growth.	
Corrosive sublimate :				
1 : 1000	No growth.	No growth.	No growth.	
1 : 2000	No growth.	No growth.	No growth.	
1 : 3000	No growth.	No growth.	No growth.	
1 : 5000	Growth.	No growth.	No growth.	
1 : 10,000	. . . . . .	No growth.	No growth.	
1 : 15,000	. . . . . .	. . . . .	No growth.	No growth.
Lime :				
saturated solution	. . . . . .	Growth.	No growth.	No growth.
Carbolic acid :				
0.25 per cent.	Growth.	Growth.	Growth.	
0.50 "	Growth.	Growth.	Growth.	
1.00 "	No growth.	No growth.	No growth.	
Trikresol :				
0.25 per cent.	No growth.	No growth.	No growth.	
0.50 "	No growth.	No growth.	No growth.	
1.00 "	No growth.	No growth.	No growth.	
Sulphur dioxide :				
1.25 per cent.	. . . . . .	No growth.		
2.50 "	. . . . . .	No growth.		
5.00 "	. . . . . .	No growth.		
10.00 "	. . . . . .	No growth.		

Thermal death-point between 58° and 60° C.

So far as known to the writer, experiments with the plague-bacillus are being conducted in but three laboratories in the United States, namely : Hoagland Laboratory in Brooklyn, the Laboratory of the Health Department of New York City, and the Laboratory of the Marine-Hospital Service in Washington. It may be said, in general, that the

investigations in these laboratories are confirmatory of the results of the investigations in the laboratories heretofore mentioned.   A special investigation is being conducted, however, in the Hoagland Laboratory by Dr. E. H. Wilson, upon the life-history of the bacillus, and in a telegram received February 14th, in response to an inquiry, he informs me that the bacillus in a dark closet, on filter-paper and on wool-blanket, is still living at the end of the eighteenth day.   The experiments conducted by Drs. J. J. Kinyoun and H. D. Geddings in the Laboratory of the Marine-Hospital Service have related especially to the action of disinfectants, the results of which are set forth in the preceding table.

The prescribed limits of this article prevent any considerations concerning the contagious and infectious character of the disease and the conditions which cause its spread.   Neither is it possible herein to describe the measures which have been taken to prevent the spread of the disease in foreign countries and to prevent its introduction into the United States.   These subjects would require a special treatise.

THE SERUM-TEST FOR THE DIAGNOSIS OF TYPHOID FEVER,

WITH A DESCRIPTION OF THE METHODS FOLLOWED AND THE RESULTS
OBTAINED IN ITS USE IN THE LABORATORIES OF THE HEALTH
DEPARTMENT OF NEW YORK CITY.

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AND

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As has been pointed out by Widal, the observations of Pfeiffer, Grüber, and Widal, showing that the blood-serum of persons ill with typhoid fever exercises a peculiar influence upon recent broth-cultures of the typhoid bacillus, introduce an entirely new phase in the practical application of bacteriological work in the study of the infectious diseases.

Hitherto bacteriological investigations, in their clinical application, have been confined solely to the demonstration of pathogenic microorganisms, either by culture or by direct microscopical examination in the tissues, fluids, or secretions of the body.   These new observations have disclosed a method which permits of the diagnosis of typhoid fever by the peculiar reaction occurring in broth-cultures of the typhoid bacillus when the blood-serum of a typhoid patient is added.

The development of our present knowledge of the subject may be briefly traced as follows :

As long ago as 1892 Grüber described an agglomeration of the bacilli as occurring in guinea-pigs which had died after cholera-infection; but to Pfeiffer is undoubtedly due the credit of having observed and fully described the peculiar influence of the respective serums of immunized animals on the cholera-vibrion and the typhoid bacillus when added to broth-cultures of these organisms and the mixtures then introduced into the peritoneal cavity of other animals.

In various communications published in 1894 and 1895 Pfeiffer showed that when cultures containing dead or living cholera-spirilla or typhoid bacilli are injected subcutaneously into animals or man specific protective substances are formed in the blood of the individuals thus treated. These substances grant a more or less complete immunity against the invasion of the living germs of the respective diseases. He also described the occurrence of a peculiar phenomenon when a portion of a fresh culture of the cholera-vibrion on agar is added to a small quantity of the serum of an animal immunized against cholera, and the mixture injected into the peritoneal cavity of a non-immunized guinea-pig. After this procedure, if from time to time minute drops of the liquid be withdrawn in capillary tubes and examined microscopically, it is found that the vibrions, which were formerly, and in control-animals which remain, actively motile, become in a very short time, under the influence of the serum, entirely motionless and later dead. They are first immobilized, then they become somewhat swollen and agglomerated into balls or clumps, which gradually become paler and paler, until finally they are dissolved in the peritoneal fluid. This process takes place regularly, in about twenty minutes, provided a sufficient degree of immunity be present in the animals from which the serum was obtained.

The animals injected with the mixture containing cholera-cultures and the serum of immunized animals remain unaffected, while control-animals treated with a fluid containing only the serum of non-immunized animals mixed with cultures of the cholera-vibrion promptly die.

Pfeiffer claimed that the reaction of the serum employed in this manner is so distinctly specific that it may serve for the differential diagnosis of the cholera-vibrion from other vibrions. If a mixture of the cultures of two vibrions is used in this experiment, only that species is destroyed which has been employed to immunize the animal whose serum is introduced with the cultures. These latter observations of Pfeiffer were made before 1894, and were demonstrated to one of the writers early in 1894 in the Institute for Infectious Diseases in Berlin.

In March, 1896, Pfeiffer and Kolle published an article in the *Deutsche med. Wochenschrift*, entitled "The Differential Diagnosis of Typhoid Fever by Means of the Serum of Animals Immunized against Typhoid Infection." In this communication the authors say that by the aid of the serum of convalescents from typhoid fever, or of animals immunized

against typhoid infection, typhoid bacilli can be differentiated from the bacillus coli communis and from other bacteria resembling the typhoid bacillus. This is accomplished by mixing the serum with cultures of the typhoid bacillus and introducing the mixture into the peritoneal cavity of guinea-pigs. A specific reaction appears, which can be followed microscopically. Agglomeration and agglutination of the bacilli occur, followed by deformity and final solution. The animals remain unaffected. The bacteria belonging to the coli group, and all other similar bacteria, are not influenced in this test when the serum of animals immunized to the typhoid bacillus is employed. "This change takes place only with the typhoid bacilli, and is a specific reaction due to the bactericidal reaction of the typhoid serum."

It was further found, if the serum from a goat, which had been immunized (so that its immunity was about ten times as great as that of the average convalescent from typhoid fever), was diluted with forty parts of bouillon, and a similar dilution made of the serum of non-immunized animals, and both solutions were then inoculated with a culture of the typhoid bacillus and placed in an incubator at 37° C., that after the expiration of one hour macroscopical differences in the culture could be observed, which increased in distinctness for four hours and then gradually disappeared. The reaction occurring may be described as follows: in the tube in which the typhoid culture is mixed with typhoid serum the bacilli are agglomerated in fine whitish flakes, which settle to the bottom of the tube, while the supernatant fluid is clear or only slightly cloudy. On the other hand, the tubes containing mixtures of bouillon with the cholera-serum, or the serum from non-immunized animals inoculated with the typhoid bacillus, became and remained uniformly and intensely cloudy. These two serum-mixtures, examined microscopically in a hanging drop, also show distinct differences. The typhoid serum mixture inoculated with the typhoid bacilli exhibits the organisms entirely motionless, lying clumped together in heaps; in the other mixture the bacilli are actively motile.

Pfeiffer and Kolle say further: "No such differences were shown when bacteria of the coli group were examined after mixture with the typhoid serum." They conclude: "It would seem, therefore, that this method, which is simple of execution in any laboratory, may be of great practical value as an aid to differential diagnosis."

Grüber, in an article in the *Wiener med. Wochenschrift* for March, 1896, describes some investigations conducted in conjunction with Dr. Herbert E. Durham, of London. He criticises Pfeiffer's conclusions and attempts to show by a series of experiments that the reaction described by Pfeiffer is by no means specific, and that when the reaction is positive the diagnosis still remains in doubt, for the reaction is *quan-*

titative only, and not *qualitative*, so far as the cholera-vibrion is concerned. Grüber expresses the opinion, however, that it is of greater service with regard to the typhoid bacillus, and concludes that these investigations will render great assistance in the clinical diagnosis of cholera and typhoid fever. He describes a method for applying the test in regard to both of these organisms, which closely resembles that of Pfeiffer's.

Durham published a paper in the *British Medical Journal* of March 19, 1896, on "The Special Reaction of the Serum of Highly Immunized Animals, and the Use of this Serum for Diagnostic and Other Purposes." He describes in considerable detail the use of these serums, and draws a series of conclusions as to the value of the reactions.

The first practical application of this method for the diagnosis of typhoid fever on a more extensive scale was made by Widal and reported with great fulness and detail in a communication published in June, 1896, in *La Semaine Méd.*

Widal describes the phenomenon as follows: "Several bouillon-tubes are separately inoculated with the typhoid bacillus and the bacillus coli communis. A few drops of the serum of an animal thoroughly immunized against typhoid infection are added to each of these, and they are then placed in an incubator at $37°$ C. In four or five hours the tubes containing the bacillus coli communis begin to become cloudy, while the tubes inoculated with the typhoid bacillus remain almost entirely clear. At the end of twenty-four hours the tubes with the bacillus coli have become intensely cloudy throughout, while those containing the typhoid bacillus remain clear or are but slightly cloudy, the microbes in these tubes having been precipitated as whitish flakes to the bottom.

"A drop of the culture of the bacillus coli examined microscopically shows isolated bacteria, for the most part actively motile. A drop of the culture of the typhoid bacillus, on the other hand, when examined microscopically, presents only scattered agglomerations of bacteria which are immobile, deformed, thickened, and agglutinated together. No isolated or motile bacteria are to be seen. The formation of a precipitate visible to the naked eye, and, microscopically, the immobilization, agglutination, and deformity of the microbes are the characteristics of the phenomenon.

"The serum of an animal thoroughly immunized to the typhoid bacillus is more active than that of a patient suffering with or convalescing from typhoid fever. The greater the immunization to which the animal has been subjected the more active is the serum.

"By the use of this test," Widal continues, "I have examined the serum obtained from some six typhoid fever patients on the seventh, twelfth, fifteenth, sixteenth, nineteenth, and twenty-first days of the disease, to determine whether it could be employed for the clinical diagnosis of

typhoid fever. Each time I readily obtained undoubted evidences that the serum exerted an immobilizing and agglutinating action on the bacilli in cultures of the typhoid organism."

The method employed in this investigation was as follows: a small quantity of blood having been withdrawn, under aseptic precautions, with a sterilized syringe from a vein at the elbow, the serum, after coagulation of the blood, is decanted and a few drops introduced into a tube containing a broth-culture of the typhoid bacillus, the proportion being one part of serum to ten or fifteen parts of broth. The tube is then placed in an incubator at a temperature of 37° C. After twenty-four hours, when the typhoid serum has been employed, the characteristic reaction as described is apparent to the naked eye, and is seen microscopically in the hanging drop.

The peculiar appearance of the culture is still evident after two, three, or four days, but at the end of the first twenty-four hours the precipitate seems to be most abundant.

"This phenomenon may be observed in a simpler manner," Widal says, "by withdrawing several drops of blood from the end of the finger, under aseptic precautions, and after the blood has clotted the serum is separated and added drop by drop to a broth-culture, in the proportion of one to ten. If the serum has been obtained from a case of typhoid fever, a characteristic reaction will be immediately observed.

"When the blood-serum of patients in good health, or of those suffering from other diseases than typhoid fever, is subjected to this test, few or none of the appearances observed in the above reaction are seen. The reaction may be found for considerable periods after recovery from typhoid fever."

In subsequent communications Widal reports further observations. In one of these communications he refers to the resistance of the agglutinating property of the serum, and notes that the dried serum and the dried blood as well, to a less extent, retain the specific action.

Achard has shown that exposure to diffused sunlight, extending over a period of weeks, produces no change in the agglutinating property of the blood or serum. He also found that various fluids and secretions of typhoid patients possessed the same property in a greater or less degree. The serous fluid of blisters, the serum from pus, tears, and urine of typhoid patients; the milk of a wetnurse sick with typhoid fever, and other fluids possess this property. It was found that in the inflammatory exudations of serous membranes occurring during typhoid fever this property was present when the exudate did not occur too rapidly.

Achard also found the same to be true with regard to the secretion of the lachrymal glands. If the secretion was taken with a pipette from the inner canthus of the eye, it gave a marked reaction ; but if the secre-

tion was markedly increased by inhaling ammonia vapor, the rapidly flowing tears did not give the reaction.

Achard and Bensaude found that the milk of a wetnurse suffering from typhoid fever, which gave a reaction, lost this property when the milk was not pure and freshly drawn. They also found that prolonged exposure to a temperature of 60° C. did not affect the reaction; but that it was considerably diminished at 100° C., and was lost after boiling the milk for fifteen minutes at 120° C. It also disappeared after filtration through a porcelain tube, and the same was found to be the case with urine. The blood-serum of a sucking-infant, fed with milk which showed the reaction, did not possess it.

Widal and Achard attempted to ascertain what substances in the blood possess the agglutinating power. They found that blood-serum deprived of globulin had lost the agglutinating property, while the globulin retained it. They found also that when globulin and fibrin have been separated from the blood and dissolved, that each one of these substances possesses intense agglutinating power; while the plasma deprived of these, and containing only albumin, has lost its specific action. The same has been found to be true of the serous fluid of blisters and the serous fluid of the pericardium, peritoneum, etc. It would appear, therefore, that the agglutinating property belongs to the fibrin and the globulin of the blood. Similar results were noted in relation to the albumin and globulin of milk. Casein isolated and dissolved preserves powerful agglutinating properties.

The observations of Widal and others would seem to show that this peculiar phenomenon is not a reaction of immunization, but is "an infection-reaction," becoming less pronounced and sometimes disappearing during convalescence; that is, diminished at the time when immunity is most marked. In some cases it has not been found on one day, and has appeared on the next; or it is present in marked form on one day, and has disappeared on the next. In the majority of cases it diminishes in intensity soon after convalescence is established and frequently soon disappears; while in other persons it remains fairly distinct, even for some years after recovery. The serum does not actually destroy all the bacteria, as is shown by the fact that cultures still retain their power of growth after transplantation, even when mixed with active typhoid serum in equal parts and allowed to remain for long periods exposed to its action.

All observers have agreed in confirming the observations of Pfeiffer, Grüber, and Widal as to the occurrence of this peculiar phenomenon in most cases of typhoid fever at some period in the course of the disease; but in some instances it appeared on the fourth or fifth day, in others not until the end of the third week or later, and rarely not at all.

TABLE

giving the results of the method of sero-diagnosis in cases of clinically typical or suspected typhoid fever, in convalescents or those who have had typhoid, in diseases other than typhoid, and in healthy subjects, showing the number of cases tested, the period when the test was made, and the reaction.

Reporter.	Number of cases of typical or suspected typhoid tested.	Day of disease when tested.	Reaction. Positive. Decisive	Reaction. Positive. Partial or feeble.	Reaction. Negative. Decisive or confirmed.	Reaction. Negative. Typhoid fever: no reaction.	Number of convalescents tested. Period when tested after convalescence.	Number of convalescents tested. Reaction. Positive.	Number of convalescents tested. Reaction. Negative.	Number of cases other than typhoid tested. Reaction. Positive.	Number of cases other than typhoid tested. Reaction. Negative.	Number of healthy subjects tested. Reaction. Positive.	Number of healthy subjects tested. Reaction. Negative.	Test used.
Widal,	80	4th to 21st day.	45	……	35	……	1½ to 9 years.	6	16	0	200	0	39	Fluid serum.
Achard,	9	7th to 12th day.	3	……	3	3	……	……	……	……	……	……	……	" "
Dienlafoy,	2	7th to 12th day.	2	……	……	……	……	……	……	……	No. not stated. 10	……	……	" "
Chantemesse,	11	9th day.	11	……	……	……	……	……	……	0	……	……	……	" "
Rendu,	1	11th day.	1	……	……	……	……	……	……	……	……	……	……	" "
Haushalter,	39	7th to 12th day.	27	……	12	……	……	……	……	……	……	……	……	" "
Vedel,	2	……………	1	……	1	……	……	……	……	……	……	……	……	" "
Conmont,	13	……………	11	……	2	……	……	……	……	……	……	……	……	" "
Gatrin,	57	4th to 41st day.	36	……	21	……	……	……	……	0	20	0	……	" "
Theolen and Mills,	12	……………	12	……	……	……	……	……	……	……	……	……	……	" "
Grünbaum,	8	10th to 33d day.	8	……	……	……	4 to 37 years.	6	0	15[1]	4	4[1]	3	" "
Durham,	4	8th to 21st day.	2	……	……	2	10 dys. to 6 wks.	4	3	……	……	……	……	" "
Delepine,	30	8th to 23d day.	24	1	4	1	……	……	……	0	10	0	……	" " and dried blood.
Greene,	11	16th to 38th day.	11	……	……	……	……	……	……	0	14	……	……	Fluid serum.
Johnston,	143	48 hrs. to 3d wk.	118	5	14	6	……	16	1	0	35	……	……	Dried blood.
Total,	422	2d dy. to 4th wk.	312	6	92	12	……………	32	20	15	293	4	42	

[1] The positive reactions obtained by Grünbaum in cases, other than typhoid and in healthy subjects, occurred only when the serum was used in greater concentration than 1 to 10. In mixtures of 1 to 10 the reaction occurred only in typhoid fever.

The table on page 280, prepared by Dr. Arthur R. Guerard, Assistant Bacteriologist to the Health Department, shows, as well as is possible in tabular form, the results reported by various observers up to January 1, 1897, in the use of the serum-test for the diagnosis of typhoid fever.

In a total of 422 cases of typical or suspected typhoid fever, reported by fifteen different observers, 404 were diagnosticated decisively to be typhoid fever or not, 312 positively and 92 negatively; or in about 95 per cent. of cases the diagnosis was confirmed by the serum-test on the first examination; 6 of the positive reactions were partial or feeble at first, but on re-examination were decisive. 12 of the negative reactions were doubtful or remained indecisive.

In a total of 63 cases who had had typhoid fever, 32 gave the reaction and 30 did not. In 308 cases of diseases other than typhoid there was no reaction with the blood or serum in a dilution of 1 part of serum to 9 of the culture, but when the dilution of serum was less than 1 to 9 a reaction frequently occurred. Of 46 healthy subjects examined, 4 gave the reaction, or about 10 per cent.; but many persons, the number of which is not stated in the reports, were examined and gave no reaction with the typhoid cultures; therefore these data are incomplete.

The Use of the Serum-test in the Laboratories of the New York Health Department.

Wyatt Johnston, of Montreal, introduced the use of this method in municipal laboratories for the diagnosis of typhoid fever, suggesting that dried blood should be employed in place of blood-serum. Widal had shown that drying did not destroy the agglutinating properties of typhoid blood. In September and October, 1896, some investigations on this subject were begun in the laboratories of the Health Department of New York City, and in the latter part of October the Health Board issued an announcement to the physicians of this city, from which the following extracts are made:

"Observations on the blood-test for the diagnosis of typhoid fever, which have been in progress in the laboratories of the New York Health Department for some time past, have thus far confirmed the conclusions of previous investigators, and it seems probable that we have in this method not only a rapid, but also a reliable diagnostic test. Comparatively few cases, however, have as yet been examined very early in the course of the disease, and it is not positively known how early the reaction ordinarily appears.

"The Health Department therefore requests that physicians having cases which present symptoms suggestive of typhoid fever send specimens of the blood daily, or every other day, until the nature of the disease shall clinically be clearly defined.

"One source of error which must be guarded against arises from the persistence of the reaction in some cases for a number of years after an attack of typhoid fever, so that a reaction may appear in health, or in affections other than typhoid fever, if the individual have previously suffered from the latter disease.

"It must be distinctly understood that the observations thus far made are not sufficiently numerous and complete to permit a positive conclusion as to the exact value or the limitations of this test, and it is the desire of the Health Department to supply as soon as possible the data necessary to such conclusion.

"When a negative result is reported in a suspicious case the physician in attendance is particularly requested to send further specimens, and in every case to notify the Director of the Laboratory as to whether the laboratory diagnosis is finally in harmony with the clinical diagnosis or is at variance with it. In the cases in which the reaction is decided it may apparently be stated positively that the patient either has, or has had within a few years, typhoid fever. In those cases in which the reaction is present, but not well marked, only a probable diagnosis can be made. The complete absence of the reaction in the blood of a patient sick more than one week (if further examinations confirm the results thus far obtained) will justify the exclusion of the diagnosis of typhoid fever.

"DIRECTIONS FOR PREPARING THE SPECIMENS OF BLOOD. The skin covering the tip of the finger is thoroughly cleansed and is then pricked with a clean needle deeply enough to cause several drops of blood to exude. Two drops are then placed on the accompanying glass slide, one near either end. After drying, the slide is placed in the holder and returned to the station from which it was obtained or mailed to the laboratory. Full data of the case must be forwarded with each specimen. A report of the result of the examination will be mailed to the attending physician on the following day."

Arrangements were at once made so that physicians could obtain glass slides for collecting blood, with slide-holders, circulars of information, and the accompanying blanks to be filled out, from the various health department depots (nearly one hundred in number) scattered through the city. After preparation of the specimens they are returned to one of the depots and are collected by employés of the health department each afternoon, with the specimens of sputum for the diagnosis of tuberculosis and culture-tubes for the diagnosis of diphtheria. Copies of the blanks follow:

88 L—1896.

BLANK. FIRST SPECIMEN.

Typhoid Fever.

See other side for directions for preparing specimens and for temperature-record.

Date .... *Time* ....

Name of Patient ....*Age* ....

Address .... *Occ* ....

Attending Physician ....

Address ....

Clinical Diagnosis ... .

Duration of Illness .. ..

Has Patient previously had Typhoid Fever ? ....

If so, how long ago ? .. ..

If Typhoid Fever, where contracted ? ....

Has Patient been outside of New York City during the month previous to

present illness ? ....

If so, where ? ....

This blank should be filled out in full by attending physician.

BLANK. FIRST SPECIMEN (REVERSE SIDE).

Directions for Preparing Specimens of Blood.

The skin covering the tip of the finger is thoroughly cleansed and is then pricked with a clean needle deeply enough to cause several drops of blood to exude. Two drops are then placed on the accompanying glass slide, one near either end. After drying, the slide is placed in the holder and returned to a culture-station, or mailed to the laboratory. The accompanying blank must be fully filled out and forwarded with the specimen. A report of the result of the examination will be mailed to the attending physician on the following day.

Communications should be addressed to

HERMANN M. BIGGS, M.D.,
Pathologist and Director of the Bacteriological Laboratories,
Criminal Court Building, New York City.

TEMPERATURE RECORD.

	1ST DAY		2ND DAY		3D DAY		4TH DAY		5TH DAY		6TH DAY		7TH DAY		8TH DAY		9TH DAY		10TH
	A.M	P.M	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M	P.M	A.M	P.M	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.

107°
106°
105°
104°
103°
102°
101°
100°
99°

89 L—1896.

BLANK. LATER SPECIMEN.

Typhoid Fever. Later Specimens.

No. of Specimen: 2d, 3d, 4th, 5th, 6th, 7th, 8th.

Date   *Time* ....

Name of Patient   *Laboratory No.*

Address

Attending Physician

Address

Duration of Illness

Clinical Data noted since Previous Specimen was taken:

This blank should be filled out in full by attending physician.

See other side for directions for preparing specimens and for temperature-record.

BLANK. LATER SPECIMEN (REVERSE SIDE).

Directions for Preparing Specimens of Blood.

The skin covering the tip of the finger is thoroughly cleansed, and is then pricked with a clean needle deeply enough to cause several drops of blood to exude. Two drops are then placed on the accompanying glass slide, one near either end. After drying, the slide is placed in the holder and returned to a culture-station, or mailed to the laboratory. The accompanying blank must be fully filled out and forwarded with the specimen. A report of the result of the examination will be mailed to the attending physician on the following day.

Communications should be addressed to

HERMANN M. BIGGS, M.D.,
Pathologist and Director of the Bacteriological Laboratories,
Criminal Court Building, New York City.

TEMPERATURE RECORD SINCE PREVIOUS SPECIMEN WAS TAKEN.

A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.

The facilities thus offered to the physicians of New York City for determining the value of the serum-test for the diagnosis of typhoid fever have been quite largely utilized, and a full description of the results obtained is given below.

In a majority of the tests made in the Health Department laboratories specimens of dried blood have been used; in a small number only the serum from coagulated blood or blisters.

Ordinarily the reaction has been watched under the microscope in the hanging drop. The influence of the serum upon larger quantities of partially or completely developed broth-cultures has only been observed

in a moderate number of cases for the purpose of comparing the results with the routine method.

TECHNIQUE OF OBTAINING SERUM AND DRIED BLOOD.   Blood may be easily obtained by pricking the tip of the finger or the ear.   Two or three large drops should be collected on a glass slide and allowed to dry. Paper is not as good a receiver for the blood as glass, for the blood soaks more or less into it, and later, when it is dissolved, some of the paper-fibre is apt to be rubbed off with it.

In preparing the specimen for examination the dried blood is brought into solution by mixing it with about five times the quantity of water. Then a drop of this decidedly reddish mixture is placed on a cover-glass and to it is added a drop of a fifteen- to twenty-hour bouillon-culture of the typhoid bacillus.   The two drops, after being mixed, should have a faint reddish tinge.   The cover-glass, with the mixture on the surface, is inverted over a hollow slide (the edges about the concavity having been smeared with oil or fluid vaseline so as to make a closed chamber, and the hanging drop then examined under the microscope (preferably by gas-light), a high-power dry lens (about ⅛ inch) being used.

If the reaction takes place rapidly, the first glance through the microscope reveals the completed reaction, all the bacilli being in loose clumps and nearly or altogether motionless.   Between the clumps are clear spaces containing few or no isolated bacilli.

If the reaction is a little less complete, a few bacilli may be found moving slowly between the clumps, in an aimless way, while others attached to the clumps by one end are apparently trying to pull away, much as a fly caught on fly-paper struggles for freedom.

If the agglutinating substances are still less abundant, the reaction may be watched through the whole course of its development.   Immediately after mixing the blood and culture together it will be noticed that many of the bacilli move more slowly than before the addition of the serum. Some of these soon cease all progressive movement, and it will be seen that they are gathering together in small groups of two or more, the individual bacilli being still somewhat separated from each other. Gradually they close up the spaces between them, and clumps are formed.   According to the completeness of the reaction, either all the bacilli may finally become clumped and immobilized or only a small portion of them, the rest remaining freely motile, and even those clumped may appear to be struggling for freedom.   With blood containing a large amount of the agglutinating substances all gradations in the intensity of the reaction may be observed, from those shown in a marked and immediate reaction to those appearing in a late and indefinite one, by simply varying the proportion of blood added to the culture-fluid.

PSEUDO-REACTIONS WITH DRIED BLOOD.   If too concentrated a solution of dried blood from a healthy person is employed, there will be an

immobilization of the bacilli, but no true clumping. This is sometimes mistaken for a reaction. Again, dissolved blood always shows a varying amount of detritus, partly in the form of fibrinous clumps, and prolonged microscopical examination of the mixture of dissolved blood with a culture-fluid shows that the bacilli often become more or less entangled in these clumps, and in the course of one-half to one hour very few isolated motile bacteria are seen. The fibrinous clumps, especially if examined with a poor light, may be very easily mistaken for clumps of bacilli. This pseudo-reaction is regarded by many inexperienced observers as a true typhoid reaction, but it occurs as readily with non-typhoid as with typhoid blood.

THE USE OF SERUM OBTAINED FROM BLISTERS OR THE BLOOD. Fluid serum can be easily obtained in two ways: 1st. The serum may be obtained directly from the blood thus: the tip of the finger or ear is pricked with a lancet-shaped needle, and the blood as it issues is allowed to fill by gravity a capillary tube having a central bulb. The ends of the tube are then sealed by heat or wax, and as the blood clots a few drops of serum separate. This method of obtaining blood-serum has the advantage of rapidity; but also this disadvantage, namely, that the serum thus separated is apt to contain more or less blood-cells, which somewhat obscure the field when the liquid serum is immediately mixed with the culture, and which cause clumps of detritus (resembling, though less marked, those found with the dried blood), if the serum is allowed to dry. 2d. The serum may be obtained from a blister. In the examinations thus far made this has given far more satisfactory results. The method is as follows: a piece of cantharides-plaster the size of a five-cent piece is applied to the skin at some spot on the chest or abdomen. A blister forms in from six to eighteen hours. This should be protected from injury by a vaccine shield or bunion plaster. The serum from the blister is collected in a capillary tube, the ends of which are then sealed. Several drops of the serum can be easily obtained from a blister so small that it is practically painless and harmless. The serum obtained is clear and admirably suited for the test.

THE ADVANTAGES AND DISADVANTAGES OF SERUM AND DRIED BLOOD FOR THE SERUM-TEST. The dried blood is easily and quickly obtained and does not deteriorate or become contaminated by bacterial growth. It is readily transported, and seems to be of nearly equal strength with the serum in its agglutinating properties. It must, however, in use, be diluted with at least five times its bulk of water, otherwise it is too viscid to be properly employed. The amount of dilution can only be determined roughly by the color of the resulting mixture, for it is impossible to estimate accurately the amount of dried blood from the size of the drop.

Serum, on the other hand, can be used in any dilution desired, varying

from a mixture which contains equal parts of serum and broth-culture to that containing 1 part of serum to 100 parts of culture. It can be measured roughly by the platinum loop, or more carefully by a graduated capillary pipette. The disadvantages in the use of serum are entirely due to the slight difficulty in collecting and transporting it, and the delay in obtaining it when a blister is employed. If the serum is obtained from blood after clotting has occurred, a greater quantity of blood must be drawn than is necessary when the dried blood method is used. If it is obtained from a blister, a delay of eight to eighteen hours is required. The transportation of the serum in capillary tubes presents no difficulties if tubes of sufficiently thick and tough glass are employed and a proper case supplied.

THE TYPHOID CULTURE EMPLOYED. The majority of tests have been made with an eighteen, to twenty-hour broth-culture of a typhoid bacillus which was received from Pfeiffer during the past summer. Its virulence is such that one-fifth of a milligramme of a fresh agar-culture injected into the peritoneal cavity of a guinea-pig kills it in thirty-six to seventy-two hours.

Two other cultures of about one-half the virulence of the Pfeiffer culture have also frequently been used, and occasionally some one of a half-dozen other cultures whose virulence has not been tested. These latter include the culture used by Wyatt Johnston, which was kindly furnished to us. All these cultures gave fair reactions; some seemed to give more typical clumping than others, and the Pfeiffer culture particularly gave the most characteristic reactions. We have by chance used the method, adopted by Johnston, of planting our broth-cultures from old-stock cultures, but have not found it possible to avoid by this method moderate or pseudo-reactions in some cases not having typhoid fever. It seems to us that the main requirement is to have a broth-culture not over twenty-four hours old, in which the bacilli are isolated and actively motile, and the degree of whose motility is known.

THE DILUTION OF THE BLOOD OR SERUM TO BE EMPLOYED AND THE TIME REQUIRED FOR THE DEVELOPMENT OF THE REACTION. The serum-test, as shown by Widal, Grünbaum, and others, is quantitative and not qualitative. By this it is not meant to assert that the agglutinating and immobilizing substances produced in the blood of a typhoid patient are the same as those present at times in normal blood or those produced in the blood of persons sick with other diseases. It is intended, however, to maintain that the effect upon the bacilli as observed under the microscope is identical; the difference being that in typhoid fever, as a rule, the reaction occurs after the addition to the culture of far smaller quantities of serum than in other diseases, or when the same dilution is used it occurs far more quickly and completely with the typhoid serum. That the test is quantitative and not quali-

tative is well shown by the results of the examination of the seven following consecutive cases from Bellevue Hospital. Four of the cases were ultimately proved not to have been typhoid fever.

Case.	History, symptoms, and diagnosis at time of taking blood-specimens.	Corrected diagnosis on completion of illness.	Reaction of bacilli in broth-cultures to serum in different dilutions.		Reaction.
			Amount of serum.	Amount broth-culture	
1	Adult; sick four weeks, continuous high fever; pleurisy; "tuberculosis" with possibility of typhoid.	Tuberculosis.	1	1	Not appreciable.
2	Boy; sick two weeks; continued moderate fever, abating when test was made; prostration, constipation; no typhoid symptoms except fever and prostration; "atypical typhoid fever."	Uncertain.	1	1	Not appreciable.
3	Adult; symptoms of acute articular rheumatism only; "acute articular rheumatism."	Acute rheumatism.	1 1 1	1 4 9	Delayed moderate. Delayed very slight. Not appreciable.
4	Adult; just convalescent after sickness giving characteristic symptoms and physical signs of pneumonia; "pneumonia."	Pneumonia	1 1 1 1	1 4 9 19	Immediate marked. Delayed moderate. Delayed slight. Not appreciable.
5	Adult; continued high fever; enlarged spleen; typhoid bacilli obtained from spleen; "typhoid fever."	Typhoid fever.	1 1 1	1 4 9	Immediate. Delayed incomplete. Delayed very slight.
6	Adult; relapse after four w'ks of continuous fever with typhoid symptoms; "relapse after typhoid fever."	Typhoid fever.	1 1 1 1 1	1 10 50 100 200	Marked immediate. Marked immediate. Marked immediate. Delayed moderate. Delayed slight.
7	Adult; seven days continued high fever; typhoid symptoms; two days later an atypical rash; "typhoid fever."	Typhoid fever.	1 1 1 1 1	1 9 49 99 199	Marked immediate. Marked immediate. Marked immediate. Delayed but marked. Delayed moderate.

If other selected cases were added, a complete graduation in the intensity of the reaction with typhoid serum could be given. These seven suffice for the present purpose. It will be noted that two of the cases showed no reaction; neither of these had typhoid fever. A third gave a delayed moderate reaction with equal parts of the serum and culture; a fourth gave with this dilution an immediate marked reaction, and with one part to ten a delayed, slight reaction. No one of these four cases (which were not typhoid fever) gave an immediate marked reaction with a one in ten dilution, but one did give a delayed reaction. Of the typhoid cases one gave a reaction not more marked than that found in one of those not typhoid fever. The other two typhoids gave a characteristic reaction in a dilution twenty times greater than the others.

Our results have shown that in a certain proportion of cases not typhoid fever there occurs a delayed moderate reaction in a one in ten dilution of serum or blood; but very rarely, excepting in typhoid fever, does a complete reaction occur in this dilution within fifteen minutes. When dried blood is used the slight tendency of non-typhoid blood in one in ten dilution to produce agglutination is increased by the presence of the fibrinous clumps and perhaps by other substances derived from the disintegrated blood-cells.

The mode of procedure now employed is as follows: the test is first made with a one in ten dilution of serum or dried blood; if complete clumping and immobilization of the bacilli immediately occur, this is denominated "marked immediate typhoid reaction." The test is then repeated with greater dilutions.

If upon examination of the mixture in a hanging drop the bacilli show an immediate inhibition in their motility and a tendency to clump, and if upon later examination this clumping becomes marked within fifteen minutes, this is called a "moderate probable typhoid reaction." If within five minutes no change is noted in the motility of the bacilli, but slight clumping occurs later, this is noted for future reference and for its negative value; but such a reaction is never called a "typhoid reaction."

In order to determine whether the agglutinating substances are ever completely absent in typhoid fever, those cases in which no typhoid reaction has occurred in the usual one in ten dilution are retested with less dilutions of the serum. The complete absence of a reaction with equal parts of serum and broth-culture may be found to possess much greater value in excluding typhoid fever than a negative result obtained with the one in ten dilution.

The Proportion of Cases of Typhoid Fever in which a defi- nite Typhoid Reaction occurs, and the Time of its Appear- ance. In 108 cases in which, after the completion of the illness, a definite diagnosis of typhoid fever was finally made by the physician in charge, a marked immediate reaction occurred at the first test in 75. If the cases are arranged according to the day of the disease upon which the specimens were collected for examination, the following results are obtained:

Specimens collected.	Number of cases examined.	Reaction.		Percentage of positive results.
		Positive.	Negative.	
From 3d to 7th day	. 19	12	7	63 per cent.
During 2d week	. 39	23	16	59 "
" 3d week	. 24	19	5	79 "
" 4th week	. 9	8	1	88.8 "
" 2d month	. 17	13	4	76 "
	108	75	33	70 per cent.

The possibility that some of the cases giving no reaction and considered as typhoid fever by the physicians in attendance may not have had typhoid fever must be taken into consideration, yet many of these presented histories considered as fairly typical of typhoid fever. It is really not so important whether the reaction is present in 70, 80, or 90 per cent. of cases upon the first examination as that it is occasionally or frequently altogether absent.

In seventy-seven specimens from hospital cases in which the diagnosis was considered as almost certain, and in many of which several tests were made, there was a marked or definite typhoid reaction at some time in sixty-eight and only a slight reaction in nine. The reaction was never absolutely wanting. In hospital cases, therefore, in which repeated examinations were possible, a definite typhoid reaction was present in 88 per cent. of the cases at some time during the illness.

The majority of the cases that gave no reaction by the fourteenth day failed to give at any time a definite reaction; there were, however, two instances in which the reaction did not manifest itself until the middle of the fourth week, when the temperature had nearly reached the normal point.

The following case, in which numerous examinations were made, and which not only gave the symptoms of typhoid fever, but from the blood of whose spleen typhoid bacilli were obtained, is of great interest as proving that the blood of a typhoid patient may never, throughout the whole illness, have sufficient agglutinating substances in it to give a definite typhoid reaction in the usual dilution.

W. L., aged twenty years, Bellevue Hospital. No previous history of typhoid fever. Three weeks before admission had severe chill; during past two weeks has had continuous fever, and on admission presented the characteristic symptoms of typhoid fever. The temperature ranged between 103° and 104° for about ten days, and then fell to normal. Ten days later relapse occurred, which still continues at the time of writing, after the lapse of one week. Typhoid bacilli were obtained from the spleen by puncture on the twenty-fourth day. In this case throughout the first attack the reaction was never marked in a dilution above one part of serum to four of culture. On the second day of the relapse, however, the reaction became marked upon the addition of one part of serum to fifteen of culture.

If to the cases already tabulated are added those in which the duration of the disease at the time of the examination was not known, but in which the diagnosis of typhoid fever was established or excluded with considerable certainty, the following results are obtained:

	Reaction positive in one in ten dilution.	Reaction negative.
Number of cases finally believed to be typhoid 140	100	40
Number of cases finally believed not to be typhoid 57	0	57
Number of cases remaining in doubt, but regarded by the clinical observers as probably not typhoid . . . 3	0 3	
Total number of cases of suspected typhoid fever examined . . . 200		

The period of time between the infection and the appearance of the reaction is well shown by the experimental inoculation of man and animals with small amounts of dead typhoid bacilli.

Following the experiment performed by Pfeiffer, in which he inoculated three healthy adults with small amounts of dead bacilli, we injected nine guinea-pigs with one-tenth of a loop of typhoid bacilli killed by exposure for one hour to heat at $55°$ C. The blood of these pigs was examined daily or on every alternate day by Dr. A. W. Williams, Assistant Bacteriologist to the Health Department, for the appearance of the typhoid reaction. As in Pfeiffer's experiments on man, the agglutinating substances did not appear in any experiments until the sixth day, and in all it appeared by the eighth day. The agglutinating substances gradually diminished, but were still present in appreciable quantity at the end of four weeks.

THE PERSISTENCE OF THE REACTION. The following table shows the results as to the persistence of the reaction in the cases examined :

Convalescent.	Cases.	Reaction.
3 to 4 months .	8	Marked in 3, moderate in 2, very slight in 3.
1 year .	1	Very slight, not definite typhoid.
3 years .	1	None.
5 years .	1	Very slight.
14 years .	1	None.

The reaction disappeared on the thirty-fifth day in one case in which it had been marked on the thirtieth day.

THE REACTION WITH THE BLOOD-SERUM OF HEALTHY PERSONS AND OF THOSE SICK WITH DISEASES OTHER THAN TYPHOID FEVER. The reaction has never been observed in a one in ten dilution of the blood-serum of over one hundred healthy persons examined. Fifty-three persons have been examined who were regarded as having typhoid fever when the specimens of blood were collected, but in whom the subsequent history or the autopsy practically excluded this diagnosis. In no one of them did the blood give a marked immediate reaction in a one in ten dilution. Several gave a delayed partial reaction. These

cases, if divided according to the duration of illness when the examination was made, become grouped as follows:

Number examined during 1st week	.	.	.	.	.	13
" " " 2d "	.	.	.	.	.	27
" " " 3d "	.	.	.	.	.	6
" " " 4th "	.	.	.	.	.	4
" " " 2d month	.	.	.	.	.	3
						—
						53

Besides these there were three cases which had a continuous, irregular temperature, but no other symptoms of typhoid fever. The blood of two of these gave an immediate definite reaction in dilution one in ten with the broth-cultures of the typhoid bacillus. The third gave an immediate moderate reaction.

These cases were treated at the Roosevelt and Bellevue Hospitals. In no one of the three was the nature of the illness determined. They were all colored adults. The histories of the cases are as follows:

Case I.—Charlotte B., aged forty-five years, colored. Patient so ignorant as to make previous history untrustworthy. No history of previous typhoid obtained. For a few months she has had attacks of abdominal pain. Present illness began three days ago with nausea, vomiting, and pains in right iliac fossa.

Physical examination on admission showed tenderness most marked in right iliac region; no tumor discovered. Spleen not noticeably enlarged. Temperature on admission 103.6°, and varied afterward between 103° and 104° for four days, then fell gradually during six days to 98.4°. Pulse varied from 90 to 105. Respirations 36 to 24. Three days after fall of temperature patient had a relapse, lasting a week. Temperature reached 104° F. on the third day. After partial subsidence of temperature an operation was performed for a possible appendicitis, but an inoperable tumor of the ascending colon was found. After the operation the temperature gradually subsided to normal and has remained so up to the present time, a period of two months, notwithstanding the continued growth of the tumor. Bowels were slightly costive throughout the illness. On the fifth day of her illness a solution of dried blood when mixed with the typhoid culture gave an immediate, very marked reaction in dilution one in ten.

During the first week of convalescence the reaction continued to manifest itself, but at the end of one month it had disappeared. In this case the previous history is valueless. Of typhoid symptoms there were none except the continued high temperature. No reason for the elevation of temperature was discovered. The tumor of the intestines hardly seems to have been the cause of the continued fever or of the substances giving the typhoid reaction, as they both subsided in spite of the continued growth of the tumor.

Case II.—Thomas I., colored, Bellevue Hospital. Patient has not felt well for four weeks. Has lost some flesh and feels prostrated. No headache; feet and ankles swollen and painful for a week; appetite poor; bowels costive. On admission: temperature 101.4°, pulse 100, respiration

32. Physical examination negative, except that there is some swelling and œdema of the feet and ankles, with slight tenderness on pressure. Spleen not noticeably enlarged. History after admission to the hospital: temperature gradually subsided to nearly normal in four days and remained with morning temperature between 98° and 99° and evening between 99° and 100° for five days. It then rose to 104° and remained high for one week, after which it gradually subsided to nearly normal and remained so with the exception of two transitory rises.

The first rise in temperature was accompanied by increased general tenderness and heat in ankles and feet. Two days later there appeared areas of anæsthesia in skin of feet and toes and superficial gangrene of portions of toes and left foot, but the pain had disappeared from ankles and feet and patient felt better. He gradually improved and made a good recovery. Results of examination of serum: blood examined by Dr. J. W. Brannan seven days after admission showed no definite reaction. The blood, examined on the second day of relapse and at frequent intervals until patient was discharged, gave marked immediate reaction in a dilution one in ten, and a delayed incomplete reaction in a dilution one in twenty.

CASE III.—Adult, colored. As the reaction in a dilution one in ten, though fairly marked, was not complete, only a brief history will be given. Patient stated that he had been well until three days before admission, when, after wrestling, he had coughed up blood. On admission his temperature was 103°, pulse 90, respiration 26. Excepting for some signs of bronchitis, no physical signs of disease were found. Spleen apparently not enlarged.

An irregular fever, with temperature averaging about 103°, continued for two weeks, after which it gradually subsided. Except for the prostration and fever, there were no characteristic typhoid symptoms. On admission the diagnosis was acute phthisis or typhoid fever. The signs of disease in the chest disappeared, and patient was discharged cured.

In addition to the examinations made of the blood of persons supposed to have typhoid fever, in eighty-seven cases examinations have been made of the blood of persons who were sick with other diseases, such as tuberculosis, rheumatism, appendicitis, malignant tumors, diphtheria, scarlet fever, measles, leprosy, meningitis, leukæmia, etc. The serum from only one of these gave a marked immediate reaction in a one in ten dilution, and in this case the final diagnosis was doubtful.

The differential diagnosis of typhoid and typhus fevers is often of very great importance in a sanitary way, and in the absence of an epidemic of typhus fever is often difficult or impossible. It therefore becomes of great importance to determine whether the serum-test for the diagnosis of typhoid fever will serve to differentiate these diseases. Typhus fever is endemic in Liverpool, and with the hope of determining this question we requested Dr. E. W. Hope, Medical Officer for Health of Liverpool, to forward some samples of typhus blood. He very kindly sent three samples in capillary tubes; as we were afterward informed, all from cases in the same family. Two of these showed no

reaction, even when the serum and culture were mixed in equal parts; one showed a marked reaction. The possibility of a mistaken diagnosis of this case is strongly suggested, although we are informed that the case was one typical of typhus fever. As no other data on this question are at hand, it must be left unanswered for the present.

THE EFFECT OF THE SERUM FROM THE BLOOD OF THOSE SUFFERING FROM TYPHOID FEVER UPON OTHER VARIETIES OF BACILLI. Achard has found that certain bacilli, which, though closely allied to the typhoid bacillus, are still to be clearly distinguished from it, show the same clumping when mixed with the serum of immunized animals as the typhoid bacillus.

He also describes three cases from which these bacilli were obtained in which the serum of the patients caused marked clumping of the typhoid bacilli in dilution not greater than one in ten.

We have found that a number of varieties of motile bacilli other than the typhoid bacillus are clumped by the serum from persons suffering from typhoid fever, even when the serum is used in quite high dilutions.

These bacilli are also clumped, but to a much less extent, with serum from some persons suffering from other diseases. These experiments, which have been carried on chiefly by Dr. Hiss, Assistant Bacteriologist to the Health Department, are still incomplete.

A careful study of all the cases examined has been made to determine whether the agglutinating substances are more likely to be present in cases of typhoid fever which run a typical course than in those which present an irregular type of the disease.

An analysis of the 140 cases detailed above shows that although a reaction is perhaps more frequently obtained in the characteristic cases, yet it is often very strongly marked in atypical forms of the disease.

ANALYSIS OF RESULTS. The clumping and immobilization of the typhoid bacilli in broth-cultures occasionally caused by the blood-serum of persons ill with diseases other than typhoid fever are apparently identical with those caused by the serum from cases of typhoid fever; the difference being that in the latter the agglutinating substances are usually present in far greater amount. As, therefore, the serum-test for the diagnosis of typhoid fever is quantitative and not qualitative, it becomes necessary that a large number of examinations be made before it can be determined to how great an extent these agglutinating substances may be present in non-typhoid blood.

The exact diagnostic value of the serum-test and its precise limitations can only be determined when this is known. It is possible, however, to arrive at a probable estimate of its value from the results already obtained. From our investigations it would appear that the agglutinating substances are present in the blood-serum of over two-thirds of the cases

of typhoid fever by the end of the first week, in sufficient concentration
to give a reaction with broth-cultures of the typhoid bacillus when
these are mixed in the proportion of one to ten. A reaction with this
dilution does not occur in more than 2 per cent. of non-typhoid cases.
The reaction occurs in a dilution of one part of serum to forty parts of
a broth-culture in over one-half of the cases of typhoid fever by the
end of the first week ; with this dilution the reaction rarely, if ever,
occurs when serum from other cases is used.

It seems probable, therefore, that a positive diagnosis may be reached
in 50 per cent. of the cases of typhoid fever, and a probable diagnosis
in half the remaining cases, by estimating the amount of the agglutin-
ating substances in the blood.

The absence of the reaction in a one to ten dilution in any case in a
single examination does not exclude the diagnosis of typhoid fever, but
the absence of the reaction in a series of examinations in a single case
has decided value in probably excluding this disease.

The absence of the reaction will be useful in excluding typhoid fever
in doubtful local epidemics where several cases can be examined, and
in determining the nature of some fevers of a doubtful character ; for
although in no single case can typhoid fever be excluded, yet if the
reaction occurred in no one of several cases this would clearly indicate
that as a class these were not of the nature of typhoid fever. It is
possible, also, that further examinations may show that where undiluted
serum is used the complete absence of reaction has great value in posi-
tively excluding typhoid fever.

The direct microscopical examination, in the hanging drop, of a
broth-culture of the typhoid bacillus and serum or blood mixed in
proper proportions is the best method of applying the serum-test for
general diagnostic purposes because of the small amount of serum or
blood required. This method also seems as reliable as any.

Dried blood and blood-serum have given practically identical results ;
but there is a decided advantage in the use of the serum, because it may
be used in a more concentrated mixture with the broth-culture than the
dried blood in solution, and the proportions in the mixture may be more
accurately determined. With dried blood in solution, the reaction, to
be of value, should be fairly developed within a few (ten) minutes.
With serum a longer time may be allowed for the development of the
reaction, as pseudo-reactions are less likely to occur.

The duration of persistence in the blood, after convalescence, of the
substances giving the reaction, varies greatly in different cases. In a
few instances these substances rapidly diminish in amount ; in most
cases, however, they remain for some months, and exceptionally to a
moderate extent for years. The substances rarely, if ever, persist more

than a year in sufficient quantity to interfere with the diagnostic value of the test in a subsequent illness.

This test will apparently be of value in many doubtful cases of typhoid fever in which the diagnosis remains uncertain after the fifth day of the illness, and in the differential diagnosis of those irregular forms of the disease which it is often difficult to distinguish clinically from typhus fever: malarial fever, miliary tuberculosis, malignant endocarditis, septicæmia, etc.

While the test is passing through the experimental stage it is impossible to make such positive statements as to the diagnostic value to be attached to the presence or absence of the reaction in any given case as may, perhaps, be permitted at a later time.

Meanwhile all observers in reporting cases should carefully note the method of examination, the dilution of serum or blood employed, and the exact grounds upon which the diagnosis is based. Those cases in which exact pathological or bacteriological examinations are obtained will be of especial value.

It is probable that there are obscure forms of disease due to the typhoid bacillus not now recognized as typhoid fever, and also other febrile affections now considered as typhoid fever which are really of another nature; therefore, unless great caution is observed in drawing conclusions, the reaction will be stated to have been present in cases, which were not typhoid fever when in reality these cases were typhoid fever; and, on the other hand, the reaction will appear to have been too frequently absent in cases of typhoid fever, because some of the cases were really of some other nature.

The method of serum-diagnosis in typhoid fever is simple and easy of performance in the laboratory by an expert bacteriologist, but it cannot be recommended for routine employment by the practising physician as a clinical test.

We desire, in conclusion, to express our obligations to many physicians for numerous data furnished, and also especially to Drs. Tillinghast and Clarke, of Roosevelt Hospital, and Drs. Don, Bigelow, and Goldberger, of Bellevue Hospital. Valuable assistance was rendered in these investigations by many members of the laboratory staff of the Health Department, and particularly by Drs. Lambert, Williams, Hiss, Guerard, and Wilson, assistant bacteriologists.

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THE EFFECT OF ANÆSTHESIA UPON TEMPERATURE AND BLOOD-PRESSURE.[1]

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THIS paper is based upon observations made upon thirty-five dogs and eighty patients. To these have been added the conclusions which seem to be warranted by the observations.

Before beginning to detail the experiments it may be desirable to state what led to their being undertaken. An extended observation of most of the noted surgeons, both of Europe and America, led me to question the special causes of their success or failure. Without considering the subjects of sepsis and antisepsis, there were three factors which particularly attracted my attention. Some surgeons were very slow in their operations, and seemed to disregard the loss of heat during prolonged operations upon patients with inadequate covering. I have seen one of the most noted surgeons of Germany perform a laparotomy lasting nearly two hours, the patient covered only with a couple of sheets, in a room with the window open, in which it was uncomfortably cool for me while watching the operation, clad in a winter suit. Another surgeon of equal reputation performed all his laparotomies with the patient lying upon a glass slab covered only with a sheet. On the other hand, I have seen another surgeon, equally noted, much less careful in his asepsis, but still very successful. He exercised, however, the greatest care to prevent loss of time and loss of blood, and to keep the patients well protected and warm

The question arose, if some definite knowledge could not be obtained with reference to the importance of the loss of temperature on the part of patients, as well as the loss of blood and the loss of time. There are evidently very great difficulties in the way of studying this subject successfully upon human beings. If one believes there are dangers in the direction mentioned, he is compelled to avoid them. For this reason it is difficult to make any statement as to the dangers arising in this direction from operations upon my own patients, since I have under all circumstances avoided them as much as possible. It is well known, however, that patients who have suffered serious injury are often brought to the hospital in a condition of shock. The temperature of such patients is often very low, and the prognosis in the case may in a degree be based upon the temperature, a low temperature being of serious significance. Is it not possible that the low temperature usually ascribed to shock may in part be due to the exposure incident to casualties in which patients are much exposed on account of inadequate covering?

I might also cite an operation which I saw performed by an eminent surgeon upon a child six years of age, the operation being excision of the knee-joint. The anæsthetic was chloroform, and the operation lasted forty minutes, the child being exposed, and no care being taken to keep it covered or preserve it from loss of heat. I was permitted to follow the patient to the ward, and a thermometer placed in the rectum for five minutes after the patient had been placed in bed registered 35.7° C., equal to 95.2° F. From what I have observed, I am satisfied that many patients go from the operating-table with great loss of temperature.

In order to study the effect of anæsthesia I made a series of experiments. In these experiments I had the benefit of the valuable co-operation and suggestion of Dr. John P. Sawyer, at that time Professor of Physiology in the Medical Department of the Western Reserve University, and was also aided by Drs. Millikin, Upson, and Sihler, of the same institution. In some of these experiments several dogs were used, in order to confirm the observations. The questions studied in the experiments were chiefly these:

1. The effect of various anæsthetics, viz., ether, chloroform, and the A.-C.-E. mixture, upon the temperature of dogs. Anæsthesia was produced under varying conditions: *a*, upon dogs without any artificial covering; *b*, upon dogs enveloped in cotton-batting; *c*, upon dogs enveloped in cotton-batting and surrounded by bottles filled with hot water (all these experiments being made in a room having a temperature of 65° to 70° F.); *d*, upon dogs without artificial covering, but in a room having a temperature of from 93° to 96° F.

2. Observations were made upon a series of dogs of the changes in temperature and blood-pressure taking place under anæsthesia associated with the withdrawal of blood from the circulation.

3. Observations were made upon the temperature and blood-pressure of dogs, under anæsthesia, suffering from the following injuries: *a*, fracture of the legs; *b*, amputations performed quickly without loss of blood; *c*, amputations performed slowly with considerable loss of blood.

The blood-pressure was measured by the kymographion, the glass pen floating upon the mercury of the U-tube, connection being made with the common carotid artery. The study of temperature and blood-pressure was undertaken as offering the most reliable evidence of the effect produced upon an animal by the depression of anæsthesia, bloodletting, and injury. The variations of the pulse were so rapid and great as to render observations in this direction valueless.

4. Observations were also made of the action of atropia, ergot, and alcohol in their effect upon temperature under anæsthesia.

The first two observations were made upon dogs in their normal condition—that is, without anæsthesia or injury.

EXPERIMENT I. Dog 1. Short hair; weight, thirty pounds; temperature, 102.5°; no covering; no anæsthetic. The temperature was taken during one and a half hours, the dog resting quietly upon a table. During the observation there was a gain in temperature of 0.3°.

Dog 2. Short hair; weight, thirteen pounds; temperature, 103.4°; covered with cotton-wadding and a blanket; no anæsthetic; temperature observed during one and one-half hours, the dog being covered all the time. The dog lost in temperature 0.6°.

It will thus be seen that one dog under normal conditions gained during one and one-half hours 0.3°; another dog, although thoroughly covered so as to prevent radiation, actually lost 0.6°. It is quite probable, however, that these variations in temperature are entirely within normal limits.

EXPERIMENT II. This experiment was performed upon three dogs, to ascertain the effect upon the temperature of a dog, without covering, to which ether was administered.

Dog 3. Short hair; weight, thirteen pounds; temperature before anæsthetization, 102.7°; the dog was uncovered; anæsthetic, ether. At the end of one hour the temperature was 94.8°; at the end of one and one-half hours, 93°. On stopping the anæsthetic the dog had a severe chill, and recovered consciousness very slowly. One-half hour after stopping the anæsthetic the temperature was 99°.

Dog 4. Short hair; weight, thirty pounds; temperature before anæsthetic, 102°; dog uncovered; anæsthetic, ether. At the end of one hour temperature was 101.2°; at the end of one and one-half hours, 99.2°. The recovery was rapid.

Dog 5. Long hair; weight, twenty-eight pounds; temperature before anæsthetic, 102°; uncovered; anæsthetic, ether. Temperature at the end of one and one-half hours, 98.5°.

On comparing these dogs it will be seen that they lost heat under the anæsthetic while uncovered. The dog which weighed thirteen pounds lost heat vastly more rapidly than the other two, which weighed more than twice that amount.

EXPERIMENT III. This experiment was upon two dogs; both were uncovered; anæsthetic, chloroform.

Dog 6. Long hair; weight, thirty-six pounds; temperature before anæsthetic, 103.3°; no covering; anæsthetic, chloroform. Temperature one-half hour after beginning to administer chloroform, 103.6°; one hour, 102.2°; one and one-half hours, 101.6°. Anæsthetic was discontinued, and one-half hour later the temperature had declined to 99.4°. One hour after stopping the chloroform the temperature was 98.9°.

Dog 7. Long hair; weight, twenty pounds; uncovered; anæsthetic, chloroform; temperature before chloroform, 103°. One-half hour after beginning to administer chloroform the temperature was 105°; one hour, 104.8°. The dog died one hour and thirty-five minutes after the administration of chloroform was begun. This animal was particularly difficult to anæsthetize, and struggled with most extreme violence, so that the record of temperature in this case was hard to interpret. The increase of temperature is probably due to the constant struggling of the dog.

The striking thing about Dog. 6 is that while the loss of temperature under chloroform does not vary greatly from that of the dogs to which ether was administered, the loss of temperature was continued after the stopping of the chloroform.

EXPERIMENT IV. The same experiment as those preceding was undertaken, except that the anæsthetic was the A.-C.-E. mixture.

Dog 8. Short hair; weight, twenty-seven pounds; temperature before anæsthetic, 102.8°; uncovered; anæsthetic, the A.-C.-E. mixture. Temperature one-half hour after beginning anæsthesia, 102.8°; one hour, 101.6°; one and one-half hours, 99.5°. After stopping the anæsthesia, in one-half hour the temperature was 98.2°; in one hour it was 99°. After stopping the anæsthesia one-half hour the dog had a chill.

It will be noticed that the results with the A.-C.-E. mixture correspond closely with those obtained under chloroform.

EXPERIMENT V. This experiment was upon two dogs, to which ether was administered; the dogs were covered with cotton, but no artificial heat was employed.

Dog 9. This experiment is of special interest, since the same dog was employed as that previously numbered Dog 3. Short hair; weight, thirteen pounds; temperature before anæsthesia, 103.2°; covered with cotton-wadding; no hot bottles; anæsthetic, ether. One-half hour after beginning anæsthesia the temperature was 102°; one hour, 102.5°; one and one-half hours, 102.1°. The anæsthesia was stopped, but the dog was kept carefully covered. A half-hour later the temperature was 101.9°.

Dog 10. Long hair; weight, fifty-one pounds; temperature before beginning anæsthesia, 101.4°; dog covered with cotton-wadding; no hot bottles; anæsthetic, ether. One hour after beginning the anæsthesia temperature was 102°; two hours, 102.6°; two hours and thirty-four minutes, 103.4°. The anæsthesia was stopped and the dog kept carefully covered, and one-half hour later the temperature was 102.8°.

On observation it will be found that the small dog, weighing thirteen pounds, which under ether and without covering lost in one and one-half hours 9.7°, when covered lost in the same period but 1.1°. The large dog, weighing fifty-one pounds, instead of losing temperature under the anæsthetic while covered, actually gained 2° in temperature. When

the ether was stopped, although the covering was continued, the temperature returned to normal.

EXPERIMENT VI. This experiment was made upon four dogs; to part was given ether, to others chloroform; all were covered with cotton-wadding and surrounded by hot bottles.

Dog 11. Long hair; weight, twenty-eight pounds; temperature before anæsthesia, 102.3°; anæsthetic, ether; covered with cotton-wadding and surrounded by hot bottles. Temperature one-half hour after beginning the anæsthesia, 103.8°; one hour, 104.7°; one and one-half hours, 105.2°. The anæsthesia was discontinued, but the dog was kept covered as before. In a half-hour after discontinuing the anæsthesia the temperature was 103.3°. This dog had a long period of excitement in going under the anæsthetic.

Dog 12. Long hair; weight, thirty-five pounds; temperature before anæsthesia, 102.9°; covered with cotton and surrounded by hot bottles; anæsthetic, chloroform. One-half hour after beginning the anæsthesia the temperature was 103.5°; in one hour, 104.3°; in one and one-half hours, 104°. With the covering continued as before, and the anæsthesia stopped, the temperature in one-half hour was 102.7°; in one hour, 101.4°. The dog panted constantly while taking the anæsthetic.

Dog 13. Long hair; weight, twenty-six and one-half pounds; temperature before anæsthesia, 103.1°; covered with cotton-wadding and surrounded by hot bottles; anæsthetic, chloroform. Temperature one-half hour after beginning anæsthesia, 104.1°. The dog died suddenly in a little less than an hour.

Dog 14. Long hair; weight, fifty-one pounds; temperature before anæsthesia, 103°; covered with cotton-wadding and surrounded by hot bottles; anæsthetic, ether. Temperature one-half hour after beginning the anæsthesia, 101.6°; one hour after, 102.4°. The dog died suddenly a little less than one and one-half hours from the beginning of the anæsthesia.

It will be noticed that Dogs 11, 12, and 13 all gained markedly in temperature under anæsthesia with artificial covering and hot bottles. Dog 14 lost somewhat at first, but died before the observation at the one and one-half hour period could be made. Dog 12, to which chloroform was administered, increased in temperature; but when the administration of chloroform was discontinued the temperature sank below normal.

The conclusions drawn from the anæsthetization of dogs while covered and surrounded by hot water almost all point to the fact that under these circumstances the temperature can actually be increased.

EXPERIMENT VII. Three dogs were given doses of fluid extract of ergot, two with and one without an anæsthetic.

Dog 15. Long hair; weight, thirty-five pounds; no anæsthetic; no covering. Temperature before hypodermatic, 102°. Hypodermatic, fluid extract of ergot, ℳxxv. Temperature one hour later, 101.6°.

Dog 16. Long hair; weight, seventeen pounds; temperature before anæsthetic, 102.5°; uncovered; anæsthetic, ether. Administered ℳxxv fluid extract of ergot. Temperature one-half hour after beginning anæsthesia, 100.7°. The dog died suddenly a little later.

Dog 17. Short hair; weight, twenty-seven pounds; temperature before anæsthesia, 102.3°; uncovered; anæsthetic, ether. Administered ℳxxv fluid extract of ergot. Temperature one-half hour after begin-

ning the anæsthesia, 102.8°; one hour, 102°; one and one-half hours, 100.8°. Temperature one-half hour after stopping anæsthesia, 101.2°.

EXPERIMENT VIII. Three dogs received injections of sulphate of atropia, one without and two with an anæsthetic.

Dog 18. Short hair; weight, thirteen pounds; temperature at the beginning of observation, 102.4°; no covering; no anæsthetic. Hypodermatic, sulphate of atropia, $\frac{1}{200}$ gr. Temperature one and one-half hours after hypodermatic, 102°.

Dog 19. Short hair; weight, thirty pounds; temperature before anæsthesia, 103.1°; uncovered; anæsthetic, ether; hypodermatic, sulphate of atropia, $\frac{1}{200}$ gr. Temperature fifteen minutes after beginning the anæsthesia, 103.1°; forty-five minutes, 102°; one and one-half hours, 101.2°. The temperature one-half hour after stopping the anæsthesia was 102.° The dog had a marked chill after stopping the anæsthesia.

Dog 20. Long hair; weight, thirty-six pounds; temperature before anæsthesia, 102.5°; uncovered; anæsthetic, ether; hypodermatic, sulphate of atropia, $\frac{1}{200}$ gr. Temperature fifteen minutes after beginning anæsthesia, 103.3°; forty-five minutes, 102.4°; one and one-half hours, 101.8°. One-half hour after stopping anæsthesia temperature was 101.2°.

A comparison of the dogs which received hypodermatics of ergot and sulphate of atropia, although insufficient in number to draw positive conclusions, would seem to indicate that the action of these drugs tends in a degree to diminish the loss of heat under anæsthesia. It will be observed that all of these dogs were uncovered, and their average loss of heat is less than that of other dogs similarly anæsthetized, uncovered, but without hypodermatics of atropia or ergot.

EXPERIMENT IX. Three dogs were anæsthetized with ether, uncovered, and various amounts of blood were withdrawn from the circulation, the amounts being proportioned to the weight of the dog.

Dog 21. Long hair; weight, thirty-five pounds; temperature before anæsthesia, 101.6°; no covering; anæsthetic, ether. One-half hour after beginning the anæsthesia temperature was 101.3°. At this time six and one-half ounces of blood were withdrawn. One-half hour after bleeding temperature was 101.2°; one hour after bleeding, 101.1°. The anæsthesia was stopped, and one-half hour later the temperature was 101°.

Dog 22. Short hair; weight, twenty-seven pounds; temperature before anæsthesia, 102.1°; uncovered; anæsthetic, ether. Temperature one-half hour after beginning the anæsthesia, 101.6°. At this time nine ounces of blood were withdrawn. Temperature one-half hour after bleeding, 99.4°; one hour after bleeding, 98.1°. Anæsthesia was discontinued, and one-half hour later the temperature was 100.5°.

Dog 23. Long hair; weight, ten pounds; temperature before anæsthesia, 102.1°; uncovered; anæsthetic, ether. Fifteen minutes after beginning the anæsthesia three ounces of blood were withdrawn. One-half hour later, temperature 102.4°; one hour later, 103.1°.

It is not easy to interpret the findings in these three dogs. Dog 21 lost but 0.5°, Dog 22 lost 4°, and Dog 23 gained 1°. It is a fact known to physiology that the immediate effect of the withdrawal of considerable amounts of blood is to increase the temperature. Perhaps the amount of blood withdrawn in these cases is not sufficient to have a marked effect upon them, since one dog remained practically

without change, one dog lost 4°, and one gained 1°. Without more experiments in this direction it would be impossible to draw deductions from them.

EXPERIMENT X. This experiment was upon two dogs, anæsthetized without covering, to which enemata of whiskey were given.

Dog 24. Long hair; weight, twenty-eight pounds; temperature before anæsthesia, 101.6°. One-half hour later six ounces of blood were withdrawn. One-half hour after bleeding the temperature was 98°; one hour after bleeding, 97.6°. Just before the bleeding an enema of one ounce each of whiskey and water was administered.

Dog 25. Short hair; weight, thirty pounds; temperature before anæsthesia, 102.7°; uncovered; anæsthetic, ether. One-half hour after beginning the anæsthesia withdrew nine ounces of blood. Temperature just after bleeding, 101.9°. Just before bleeding gave an enema of whiskey and water, each one ounce. Temperature one-half hour after bleeding, 100.2°; one hour after bleeding, 98.6°. Anæsthesia was discontinued, and one-half hour later the temperature was 98.9°.

On observation it will be seen that Dogs 24 and 25 were both large dogs, and the loss of heat was about 4° in each case. From these experiments it would appear that the use of enemata of whiskey caused an increased loss of heat under anæsthetics.

The second series of experiments was much more complicated and difficult than those which have just been detailed. In addition to observations upon temperature, observations were made upon blood-pressure. As has already been said, these were recorded upon a revolving drum, by means of a glass pen floating in a U-tube of mercury and connected with the common carotid artery of the dog. The first record of blood-pressure was made in all cases after the dog had become anæsthetized, as earlier the dog's struggles caused wide variations of blood-pressure.

The experiments were modified by various operations, such as the withdrawal of blood, the production of fractures, amputations, etc., which will now be described in detail.

EXPERIMENT XI. Dog 26. Long hair; weight, thirty-six pounds; uncovered; anæsthetic, ether. Temperature at 10 P.M., just before administering the anæsthetic, 101.6°. Temperature at 10.40, 101.7°; at 11.15, 101.7°; at 11.30, 100°; at 11.50, 99.7°. Blood-pressure at 10.30 P.M., 96 mm.; at 11.15, 86 mm.; at 11.48, 90 mm. This dog, which was a large one, lost under ether 1.9° of temperature and but 6 mm. of blood-pressure.

EXPERIMENT XII. Dog 27. Short hair; weight, twenty-four and one-half pounds; uncovered; anæsthetic, chloroform. Temperature at 9.30 P.M., just before beginning anæsthesia, 103.3°. At 9.25 P.M. a hypodermatic of atropia sulphate, $\frac{1}{150}$, morphine sulphate, $\frac{1}{12}$, was given. Temperature at 10.13, 101°; at 10.35, 100°; at 11.05, 99.6°; at 11.30, 99.9°. Anæsthesia stopped at 11.30; at 12, temperature 99.4°. Blood-pressure at 9.45, 130 mm.; at 10.35, 112 mm.; at 11.22, 96 mm.; at 11.30, 97 mm.

It will be seen that this experiment corresponds closely to that of

Dog 4; there is a marked loss of heat, and after the chloroform was stopped in both cases the temperature continued to fall. There is also a loss of 33 mm. of blood-pressure. The amounts of atropia and morphine given in the cases were small, probably scarcely enough to affect the experiments. They were given since a number of dogs had died under chloroform, and it had been suggested, and is a well-known fact, as mentioned by Dastre in his work on *Les Anesthésiques*, that chloroform-anæsthesia upon dogs is rendered more safe by this method.

EXPERIMENT XIII. This experiment is of special interest on account of the fact that the dog was uncovered and in a room of high temperature.

Dog 28. Short hair; weight, twenty-three and one-half pounds; uncovered; anæsthetic, ether. Temperature at 8.40 P.M., just before beginning the anæsthesia, 102°; 9.10, temperature of room, 96°, temperature of dog, 104.3°; 9.40, temperature of room, 92°, of dog, 105.4°; 10.10, temperature of room, 93°, of dog, 106.1°; 10.47, temperature of room, 93°, of dog, 106.4°. The dog panted violently during the observation. The blood-pressure at 9.15 was 130 mm. Repeated observations were taken, but all need not be recorded. At 9.26 the blood-pressure was 118 mm.; at 10 it was 115 mm.; at 10.55, 98 mm. It will thus be observed that although the dog was uncovered, with short hair and medium weight, the heat of the room was sufficient, even under profound anæsthesia, to raise the temperature 4.4°. In spite of the great elevation of temperature the blood-pressure decreased 32 mm. Under the anæsthesia the dog perspired very freely, and after it was stopped recovered slowly and seemed to be extremely exhausted; much more exhausted than was observed in the case of any dog, unless it was Dog 3, which lost 9.7° under anæsthesia while uncovered.

EXPERIMENT XIV. This experiment was upon a dog covered and surrounded by hot bottles.

Dog 29. Long hair; weight, fifty-five pounds; anæsthetic, ether; covered with cotton-wadding and surrounded by hot bottles. These were applied one-half hour after beginning the anæsthesia. Temperature at 9 P.M., just before beginning the anæsthesia, 102.4°; at 9.45, 102.8°; at 10.10, 104.4°; at 10.40, 105.1°; at 11, 106.1°. The temperature one-half hour after stopping the anæsthesia, the covering and hot bottles being removed, was 101.9°. The dog panted violently while covered, but panting ceased when covering was removed. At 9.30 the blood-pressure was 112 mm.; at 9.45, 136 mm.; at 10.5, 154 mm.; at 10.33, 176 mm.; at 11, 176 mm. This experiment is of very great interest in comparison with that preceding. This dog gained while covered 3.7° of temperature. Dog 28 gained 4.4° of temperature. This dog gained 64 mm. in blood-pressure, whereas Dog 28 lost 32 mm. Dog 29 did not show the exhaustion which appeared in Dog 28.

It would seem after these two experiments that whereas the dog's temperature may be increased under profound anæsthesia by the warm air of a room, or by warm covering and hot bottles, in a heated room the blood-pressure is decreased; whereas in a room of ordinary temperature the blood-pressure is increased. The dog is also much less exhausted in a room of ordinary temperature than in a hot room. It would appear, therefore, that the advantage was vastly in favor of warm covering, in a room of ordinary temperature, since the exhaustion is less and loss of temperature and blood-pressure is prevented.

EXPERIMENT XV. This experiment was one in which there was a compound fracture of the femur, followed by amputation.

Dog 30. Long hair; weight, thirty-six pounds; uncovered; anæsthetic, ether. Temperature at 9.03 P.M., before beginning anæsthesia, 102.7°. Temperature at 9.40 was 102°; at 10.15, 100.7°; at 10.59, 99.6°. Anæsthesia stopped at 11. Temperature at 11.30, 100.2°. At 9.38 there was a compound comminuted fracture made with laceration. Amputation of the femur was begun at 10.15 and ended at 10.31. At 9.35 blood-pressure was 110 mm.; at 9.50, 96 mm.; at 10.13, 104 mm.; at 10.30, 82 mm.; at 10.40, 72 mm.; at 10.45, 88 mm.; at 10.53, 85 mm. It will be observed that this dog lost 3.1° of temperature during one and one-half hours, and the loss in blood-pressure was 25 mm. during the whole period of observation. Just after the close of the amputation the loss in blood-pressure had amounted to 38 mm. It will thus be observed that in this dog the loss in temperature and blood-pressure is associated under anæsthesia, without covering and during prolonged operation.

EXPERIMENT XVI. In this experiment three legs were amputated, great care being taken to prevent loss of blood.

Dog 31. Short hair; weight, twenty-six pounds; anæsthetic, ether; uncovered. Temperature before the beginning of the anæsthesia 9.03 P.M. was 103°. At 9.35 the temperature was 101.6°; at 10, 102°. Three legs were amputated, being constricted with rubber bands, so there was no loss of blood. The right hind-leg was amputated at 9.21, the right fore-leg at 9.25, and the left fore-leg at 9.27½. Blood-pressure at 9.15 was 122 mm.; at 9.20, 132 mm.; at 9.22, 163.5 mm.; at 9.24, 175 mm.; at 9.25, 206 mm.; at 9.26, 185 mm.; at 9.29½, 192 mm.; at 9.35, 187 mm.; at 9.44, 175 mm. Observations of blood-pressure were discontinued on account of clogging of the mercury.

It will be observed that although this dog was anæsthetized while uncovered, he lost during the whole hour 2.8°, an average loss for a dog of this weight. The amputations were made about midway in the observation, and the three occupied in their completion but six and one-half minutes. There was no loss of blood, and the blood-pressure at the end of the observation, and about sixteen minutes after the completion of the last amputation, had gained 53 mm. If the blood-pressure may be taken in a degree as a measure of the condition of the animal during observation, this illustrates in a striking manner the benefit obtained by rapid operation without loss of blood.

EXPERIMENT XVII. This experiment was made upon a dog while covered, blood being withdrawn.

Dog 32. Long hair; weight, thirty-four pounds; anæsthetic, ether. Covered with cotton-wool at 9.30; no hot bottles used. Temperature at 9.06 P.M., before beginning the anæsthesia, was 102.2°; at 9.35, 102.7°; at 10.05, 102.9°; at 10.35, 103.3°; at 11.05, 103°. Anæsthesia stopped at 11.12; covering continued. Temperature at 11.45, 103°. At 10.24 eight ounces of blood were withdrawn. The blood-pressure at 9.45 was 103 mm.; at 10.20, 112 mm. Immediately after the withdrawal of blood at 10.25 the blood-pressure was 78 mm.; at 11.13, 52 mm.

In comparing Dog 32 with Dog 31 it will be seen that in Dog 32, when protected, the temperature rose under the anæsthesia. The withdrawal of blood was, however, accompanied by a loss of blood-pressure

amounting to 51 mm., or about one-half of the blood-pressure. When it is remembered that this accompanied the simple withdrawal of blood, whereas in Dog 31 the amputation of three legs took place, no blood being lost, it would seem to illustrate most forcibly the value of protecting the dog against hemorrhage.

EXPERIMENT XVIII. In this experiment the dog was covered, blood was withdrawn, and a stimulating enema administered.

Dog 33. Short hair; weight, twenty-three pounds; anæsthetic, ether; covered with cotton and a blanket, but no hot bottles. Anæsthesia was begun at 9 P.M. Temperature was not taken until 9.20, when it was 101.2°; at 9.50, 99.9°; at 10.20, 96.6°; at 10.57, 98.7°; at 11.20, 98.3°. Anæsthesia was stopped at 11.15. Temperature at 11.50, 99.2°. At 10.45 six and one-half ounces of blood were withdrawn. At 11 an enema of hot water, two ounces, and brandy, one ounce, was administered. The blood-pressure at 9.25 was 112 mm.; at 10.45, 108 mm.; at 10.50, five minutes after the withdrawal of blood, 88 mm.; at 10.53, 92 mm.; at 11, 81 mm.; at 11.15, 96 mm. A comparison of this dog with Dog 32, upon which the same experiment was performed, shows a greater loss in temperature. This may be accounted for in part by the fact that Dog 33 weighed twenty-three pounds, whereas Dog 32 weighed thirty-four pounds. The loss in blood-pressure in Dog 33 at the close of the experiment amounted to but 16 mm., as against 51 mm. in Dog 32. It is possible that the administration of alcohol at 11 P.M. may have been a factor in increasing the blood-pressure after the bleeding.

EXPERIMENT XIX. In this experiment the dog was covered and surrounded by hot bottles, and a leg was fractured and slowly amputated.

Dog 34. Hair was cut short; weight, fifteen pounds; anæsthetic, ether. At 9.15 P.M., just before anæsthesia, temperature was 102.2°. At 9.55 dog was covered with cotton-wadding and surrounded by hot bottles. At 9.47 the temperature was 98.5°; at 10.18, 97°; at 10.54, 96.6°; at 11.15, 96.2°. At 9.37 the hind-leg was fractured and slowly amputated, with some loss of blood. At 10.04 an enema of one ounce each of water and whiskey was administered. At 10.15, after the completion of the amputation, the dog stopped breathing and came near dying, but recovered with artificial respiration. Blood-pressure at 9.30 was 130 mm.; at 9.37, 132 mm.; at 9.40, just after the fracture, 106 mm.; at 9.55, 90 mm.; at 10, 98 mm.; at 10.10, 80 mm.; at 10.22, 89 mm.; at 10.30, 98.5 mm.; at 10.58, 100 mm.

It will be noticed in this experiment that the covering and hot bottles were not applied to the dog until forty minutes after the beginning of the anæsthesia. During this period the temperature had decreased 5.6°. After the dog was protected and surrounded by artificial heat the decrease in temperature was very slight. The effect of anæsthesia and operation upon this dog was most profound. The blood-pressure did not, however, decrease toward the end of this case, as in Dog 32, from which blood was withdrawn, but which had no stimulation by alcohol. When it is remembered that this dog weighed but fifteen pounds, it seems probable that the alcohol must have had an effect in preventing the loss of blood-pressure.

EXPERIMENT XX. In this experiment three legs were amputated, being constricted by rubber bands to prevent loss of blood. Later, blood was withdrawn. Unfortunately, my notes do not state whether the dog was covered or not. My memory is that the dog was covered

and surrounded by hot bottles; but if this were not true, the experiment is even more striking.

Dog 35. Long hair; weight, thirty-two pounds; anæsthetic, ether; covering uncertain. Temperature at 8.55 P.M., before anæsthesia, 102°. Temperature at 9.30, 100.2°; at 10.04, 101.9°; at 10.50, 101.6°. At 9.30 amputated hind-leg. At 9.35 one fore-leg was amputated. At 9.48 a second fore-leg was amputated. At 10.30 eight ounces of blood were withdrawn by loosening a rubber band. Blood-pressure at 9.28 was 130 mm.; at 9.35, 168 mm.; at 9.40, 116 mm.; at 9.48, 112 mm.; at 9.50, 118 mm.; at 10.29, 98 mm.; at 10.35, 54 mm.; at 10.37, 64 mm.; at 11, 75 mm. It will be seen that this dog lost in one hour and forty-five minutes but 0.4° in temperature, in spite of the fact that eight ounces of blood were withdrawn and three legs were amputated. The dog lost, however, in blood-pressure 55 mm. At the end of the amputations there was the greatest loss of blood-pressure, which amounted to 76 mm. The results in this dog are striking when compared with those in Dog 31. In Dog 31 three legs were amputated without loss of blood, the dog being uncovered. Dog 31 lost in fifty-seven minutes 2.8° of temperature; but in spite of the fact that three legs were rapidly amputated, all loss of blood being prevented, he gained in twenty-nine minutes from the time of the first observation 53 mm. in blood-pressure. Although Dog 31 was uncovered and there was some loss of temperature, he actually gained in blood-pressure. This would seem to demonstrate the benefits of rapid operation and the prevention of loss of blood.

In drawing any conclusions from the observations made in this paper I wish it to be distinctly understood that the experiments have been made from the standpoint of the clinician and not of the physiologist, and no pretence is made to physiological knowledge. It is hoped, however, that the observations may prove suggestive and perhaps aid in eliminating certain risks pertaining to surgical operations. The following conclusions would suggest themselves:

1. Dogs lose heat in marked degree under prolonged anæsthesia when produced in a room of ordinary temperature—e. g., 65° to 75°.

2. This loss of heat may be prevented largely, if not entirely, by preventing the radiation of heat by carefully covering the animal.

3. The temperature may actually be increased under anæsthesia by covering the dog, and at the same time surrounding it with hot bottles. It is not intended to be understood that it is desirable to increase temperature during operations, but simply to show that this can be accomplished. This renders it certain that loss of temperature can be prevented by proper measures.

4. That these changes in temperature are due to anæsthesia seems evident from the following facts: a, that the changes in the temperature of dogs without anæsthesia were very slight; b, that the variations in temperature under anæsthesia bore a direct relation to the conditions under which the anæsthetic was administered, viz., whether the dog was uncovered or covered, and in addition was surrounded by hot bottles.

5. The tendency of the temperature after cessation of the anæsthesia was usually to return to normal, no matter whether it had been above or below that point.

6. Ergot and sulphate of atropia, while but little experimented with, served to retard somewhat the loss of heat under anæsthesia.

7. After stopping the administration of ether the heat which had been lost was quickly regained. After anæsthesia by chloroform and the A.-C.-E. mixture the temperature continued to fall for some time after the administration of the anæsthetic had ceased.

8. Observations upon blood-pressure seemed to show that the loss of pressure corresponded closely with the loss of heat.

9. Alcohol enemata, while aiding the recovery of blood-pressure, decreased the rapidity of the recovery of heat. The experiments were, however, too few to warrant the drawing of conclusions.

10. In a room having a high temperature, viz., 93° to 96°, the dog's temperature was increased very greatly under anæsthesia—i. e., 4.6°. At the same time the blood-pressure decreased from 32 mm. The dog panted violently and was wet with perspiration, and seemed greatly exhausted at the close of the experiment.

This observation fairly raises the question, if operations under a high temperature are not exhausting to the patient as well as to the operator, and distinctly less advantageous than operations in a room of moderate temperature with the patient thoroughly protected.

11. Slow operations with loss of blood produced far greater loss of blood-pressure than operations of vastly greater magnitude performed quickly, care being taken to prevent loss of blood.

While care must be exercised in drawing conclusions from observations made upon dogs, these have confirmed me thoroughly in the belief that in prolonged operations patients should be carefully covered to prevent loss of heat, and that, if they have already lost heat from injury or exposure, the application of artificial heat is strongly indicated. The fact that dogs are covered with hair, and that their temperature is largely regulated through the respiratory tract, rather than the skin, would suggest the conclusion that if in dogs artificial covering and heat are desirable to prevent loss of heat, in human beings this is still more important. I believe also that the carelessness exhibited by many in loss of time during operations is most deleterious, and that operations performed with as much dispatch as is consistent with good work are decidedly to the advantage of the patient.

Further, care to prevent as much as possible the loss of blood is of great importance.

In conclusion, I have just a few words to say about observations made upon patients.

Since I have believed in the desirability of saving heat, time, and

blood in all serious operations, observations upon my own patients show little, unless it be that with care little loss of temperature occurs.

It is evidently impossible to measure blood-pressure upon patients as is done in dogs. There are, however, some observations of interest.

Eighty patients were observed as follows: the temperature was taken about 8 A.M., from one to two hours before the time of operation; it was taken again just before beginning the anæsthetic; and it was taken a third time just after the operation. The temperatures taken just before and just after the operations were rectal. In almost all cases there was a slight increase in temperature from the morning observation to that just preceding the operation. This averaged 0.4°. There was usually a loss of temperature during operation ranging from 0.2° to 2°. The loss of 2° was, however, very rare. The average was about 0.6°. In some cases there was no loss.

The operations were of all sorts, some being small operations; but the bulk of them were heavy operations, such as amputations of the breast, laparotomy, nephrectomy, suprapubic cystotomy, litholapaxy, removal of the appendix, cholecystotomy, etc. One observation upon a nervous patient was very interesting. Her temperature at 8 A.M. was 99.2°; about one and one-half hours later, just before the operation, it was 104.4°. After the removal of an ovarian cyst, the operation being exceedingly difficult and lasting one hour and five minutes, the temperature was 100.2°. Thus, before operation there was in a short time an increase of temperature of 5.2°, this increase being, so far as I could determine, a nervous phenomenon. These observations upon patients, showing, as they do, so little loss of temperature, seem to me to show that with care in operating a distinct source of depression may be avoided. While few will, I believe, question this conclusion, as was said in the beginning of this paper, an extended observation has impressed upon me the belief that many operators do not fully realize the importance of protecting their patients during operation from loss of temperature, loss of blood, and loss of time.

CONGENITAL ABSENCE OF UTERUS AND VAGINA.

PLASTIC OPERATION FOR ARTIFICIAL VAGINA, TAKING FLAPS FROM NYMPHÆ AND PERINEUM.

BY W. L. BURRAGE, M.D.,

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M. A., aged nineteen years and single, a native of Gloucester, Mass., was sent to me by Dr. G. N. Jones, of that city, February 14, 1894. She gave the following history:

Her father was born in Sweden and her mother in Nova Scotia, the latter having died of cancer of the uterus six years before. With this exception the family history was negative. Of her three sisters, one was married and had a child; another, sixteen years old, had menstruated regularly for four years; and the third, then fourteen years old, had not at that time had her catamenia established, but has since menstruated regularly.

The patient had never been in rugged health. She had suffered with a purulent discharge from the left ear ever since one year of age, and she had measles and chickenpox at seven to eight years of age. She had been under medical treatment for the preceding four years for general weakness, headache, weak eyes (for which she had been wearing glasses with benefit), temporal headaches, sore-throat, loss of appetite, and shortness of breath. While under treatment she had improved, and at the time of my first consultation she had a fair appetite and digestion, and her chief complaints were a weak back and the fact that she did not menstruate. As she was engaged to be married, the last fact was of especial importance to her. There had been no menstrual molimen whatever.

Physical examination showed a well-developed, rather poorly nourished woman above the average in height, of light complexion, the hair of the head long and thick, voice feminine, breasts each having a well-developed gland with a few follicles showing in the areolæ about the inverted nipples, hips large, and pelvis of female type.

Genital Organs. An abundant growth of hair on the mons and the outer surface of the labia majora. Labia majora, labia minora, vestibule, and clitoris well developed. Meatus urinarius and urethra of large calibre, taking a sound fourteen millimetres in diameter without much stretching; natural diameter about eleven millimetres. Hymen absent. Where the introitus vaginæ is normally situated the mucous membrane was redundant and wrinkled, and in the centre was the opening of a small pocket four millimetres in diameter. This pocket had a depth of one and one-half centimetres, its long axis corresponding with the axis of the normal vagina, and it was apparently lined with mucous membrane. A small amount of milky-white secretion could be expressed from it. Orifices of vulvo-vaginal glands large and normally placed. In other words, with the single exception that the introitus vaginæ and hymen were absent, the external genitals were normal.

As a bimanual examination with a finger in the rectum failed to reveal the presence of the uterus or other internal organs of generation the patient was sent to St. Elizabeth's Hospital, where an ether examination was made on the following day. Two of my colleagues on the gynecological staff of the hospital kindly saw the case with me. We all examined bimanually with the forefinger in the rectum, also with the little finger in the bladder. Then with a sound in the bladder and a finger in the rectum and with the sound in the bladder and a hand on the abdomen. The abdominal walls were thin and lax, and the intestines undistended, and, the rectum and bladder being empty, all the conditions for practising the touch were most favorable. No uterus, ovaries, or tubes, or any thickened tissues that might represent any of these organs, or the occluded vagina, were to be felt in the pelvis. The bladder and rectum seemed to be of normal size, shape, and situation. The septum between the bladder and rectum was thin.

The patient was advised to consult an aurist for treatment of the chronic inflammation of her ear, and also to see the ophthalmologist again. The condition of her genital organs was explained to her and to her married sister, and they were advised to inform her *fiancé*. She was told that if she wished to undergo an operation that possibly a serviceable vagina could be made.

After giving the matter careful consideration she decided to have the operation performed, and accordingly entered the hospital for that purpose.

Operation, March 28, 1894. The object of the operation was to separate the bladder from the rectum by incising the cellular tissue between these organs, and then to cover the raw surfaces forming the walls of the cavity so made with mucous membrane or skin, utilizing three flaps; one taken from the fourchette and perineum and one from each of the labia minora.

FIG. 1.
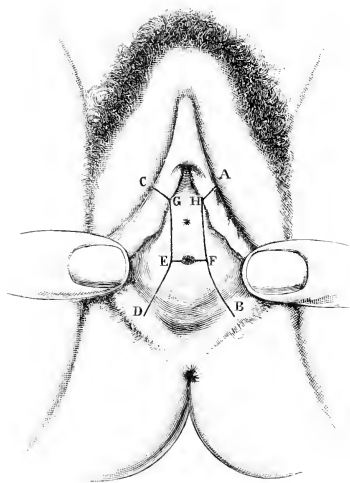
AHF and CGE. Lines of incision for flaps from labia minora.
ED and FB. Lines of incision for perineal flaps.
EF. Line of incision for excavation for new vagina.

After ether had been administered and the usual antiseptic precautions observed, the vulvar hair was shaved and the rectum thoroughly irrigated with corrosive. An attempt has been made in Fig. 1 to show the relation of the parts. The orifice of the rudimentary vagina is shown on line EF. An incision was made along this line and prolonged at each end so that it measured about three centimetres in length, splitting the rudimentary vagina into halves. With a finger in the rectum and a sound in the urethra for guides, the recto-urethral septum was split by dissecting with the scissors and finger for a distance of five

centimetres. At that point the finger in the wound was apparently separated from the intestines by a sheet of peritoneum only, and, practising the bimanual touch again, it was impossible to discover the presence of any tissue that might represent the uterus, ovaries, or tubes.

In order to cover the raw surfaces formed by the dissection, flaps were formed as follows : the nymphæ were cut off at AH and CG, and then incisions through the mucous membrane made along the lines HFB and GED. The two lateral flaps formed in this way were dissected free, and by so doing the nymphæ were split from their posterior aspect and unfolded, as it were.

The posterior flap, represented by the surface enclosed in the letters DEFB, was formed by dissecting deeply the tissues of the fourchette and perineum, so that this flap could be dragged upward and inward to cover the posterior surface of the new vagina. The strip of mucous membrane on this posterior wall that had been half of the rudimentary vagina was dissected away, and the posterior flap anchored by suturing its tip at the uppermost part of the new vagina with a catgut stitch. In the same manner the two lateral flaps were disposed of by stitching their tips at the apex of the vagina. The little strip of mucous membrane on the anterior wall from the rudimentary vagina was utilized by stitching the lateral flaps to its edges. The operation was completed by sewing together the edges of the mucous membrane at the stumps of the nymphæ and at the places where the three flaps came into apposition with fine interrupted sutures of catgut.

At the close of the operation there was a small raw surface, about one centimetre in diameter, at the highest part of the wound, that it was impossible to cover. The vagina was packed lightly with iodoform-gauze and the patient put to bed.

The after-treatment consisted in keeping the vagina packed with iodoform-gauze. The left flap broke loose on the third day, but by carefully applied pressure it is glued on again. A glass-tube that was introduced as a dilator was not well tolerated, so the house-surgeon manufactured a dilator out of a rubber finger-cot stuffed with cotton. This was worn constantly, being kept in place by a T-bandage. On May 1st the vagina measured two and one-half centimetres in diameter and four and one-half centimetres in depth. The patient left the hospital on May 3d, with instructions to wear the dilator for a month.

She was not seen again until two years later, February 29, 1896, when she appeared at my office with her husband. She reported that she had gained very much in health and had been perfectly well, with the exception of weakness of the back after exertion and of a recent attack of indigestion ; that she had then been married two months and a half ; that she had had sexual intercourse regularly since marriage, and that the intercourse was attended by sexual feelings and gratification. Her husband also said that, for his part, coition had been entirely satisfactory.

She now called my attention for the first time to a bunch in the right side of her abdomen, which she had first noticed, she said, several years ago—in fact, before the operation ; but, as it had never given her any discomfort, she had not spoken of its presence. It had moved lower down in the abdomen since the operation, and since her marriage had increased in size. Examination showed a tumor the size and shape of a large kidney situated in the false pelvis on the right side, the hilus

being toward the vertebral column. Its upper border, with the patient
on her back, was on a line drawn from the umbilicus to the right an-
terior superior spine of the ilium. It slipped from under the hand in
the manner characteristic of movable kidney, its mobility being limited
above just beyond the level of the umbilicus, on the left at the median
line, and below at Poupart's ligament. Pressure on the tumor caused
"a sickening sensation." Palpation in the right flank failed to detect
the presence of the kidney in its normal situation. The urine was
normal. It had been increased in amount, of late, she said. There
had been no pain or dragging sensation in the region of the tumor.

The tumor was surely not in its present situation at the time of the
ether examination two years before, or it would have been felt at once
by the examining hand on the abdomen. Bimanual examination with
a finger in the vagina and with a finger in the rectum showed that the
tumor had no pelvic connections that could be felt, and confirmed the
previous diagnosis of absence of the uterus.

FIG. 2.
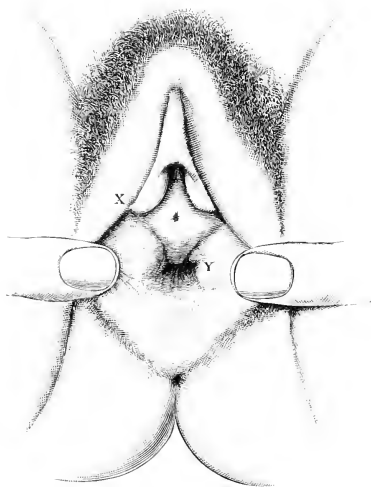
X. Stump of right labium minus.
Y. Wrinkled and brown mucous membrane to the left of introitus vaginæ.

The patient's general appearance bore out her statement regarding
her health, for she had apparently gained in flesh and certainly looked
the picture of health. Fig. 2 is a representation of the external
genitals at this time. The letter X is on the stump of the left nympha,
and Y is placed just to the left of the opening of the vagina. About
the opening there were several areas of pigmented mucous membrane,
or more properly skin, as representing the outer surface of the nymphæ.
The vagina measured three centimetres in diameter when dilated and

five and one-half centimetres in depth. It was distensible, not sensitive, well lubricated, and when examined with the speculum appeared to be lined throughout with mucous membrane.

December 9, 1896, the patient wrote that she had adopted a four months old baby, and was very happy in its care.

The first operations for the formation of an artificial vagina were done by R. Fletcher in 1831[1] and Amussat in 1832,[2] and were performed for the purpose of allowing the escape of retained menses. The operations were blunt dissections in the recto-vesical septum, were performed in many stages lasting several days, and had for their object gradual drainage through a small opening. Emmet perfected the present accepted operation of rapid evacuation of the retained fluid by a dissection of the tissues between the bladder and rectum, making a free opening and then packing the wound with gauze or a glass-plug and allowing it to cicatrize. The manifest disadvantage of such an operation is that in the course of time the newly formed vagina becomes entirely occluded by cicatrization. That this is a fact is abundantly shown by the large number of reported cases.

Credé, in 1883,[3] formed a new vagina by using one large skin-flap from one of the labia majora. Baudry[31] followed Credé's method, but obtained a poor result due to sloughing of the flap. L. Picqué[4] created a new vagina in a case of infantile uterus and absent vagina by taking flaps from the anterior wall of the vestibule and from the perineum. He obtained a vagina five centimetres long two months after the operation. He later reported a similar case done by Villar, of Bordeaux. Von Swiecicki[5] reports a case of absence of the vagina resulting from gangrene following labor in which he performed a successful plastic operation by using rabbit's intestine. Kustner[29] proposed to divide the labia minora at their inner surfaces, unfold them as in my case by dissection, unite their edges, and push the bag so formed into the excavation for the vagina. Finding this procedure impracticable, he used grafts of human intestinal mucous membrane obtained from a recent case of intestinal resection for perforating wound of the abdomen, and obtained a good result.

Mackenrodt[30] has recently made use of grafts of vaginal mucous membrane obtained from a case of prolapse to cover the raw surfaces of an excavation for a new vagina.

Schwartz[28] made a vagina by the use of four strips of mucous membrane, two lateral, one anterior, and one posterior. He got union by first intention, and eighteen months after there was a cavity five centimetres deep.

The only other cases of plastic operation for artificial vagina that I have found in literature are one by Rosciszewski, and published in Krakow in 1894; the title is "Plastic Vagina by Means of Flaps of

the Labium Prudendi, in Stenosis of the Vagina ;" and lastly, operations very like mine, by Christian Fenger, of Chicago, in 1886,[6] and Roux[32] in 1891.

In Fenger's case the patient had been operated on a year previously by Byford, for retained menses, but the vagina having cicatrized she had a return of her symptoms. Fenger made two preliminary operations two weeks apart to dilate and keep open the vagina with a plug, and two and one-half months later he performed the plastic operation. The portions of the labia minora used measured each one square inch. The labia were cut off from above and the flaps twisted on their bases as well as being split and unfolded, as in my case. He found it unnecessary to take a flap from the perineum. The subsequent course was uninterruptedly aseptic, and the result was a vagina lined throughout with mucous membrane of some secretory power. Roux used two flaps taken from the nymphae, unfolding them and stitching them in the excavation, and got a good vagina six to seven centimetres deep.

The advantages of a plastic operation for artificial vagina over the plug operation are obvious both in cases of congenital and acquired absence of the vagina. Where the labia minora are of sufficient size they seem to me to offer the most available means of covering the walls of a new vagina, as entailing less mutilation than would be the case with flaps taken from the labia majora or vestibule, and I should agree with Fenger that a bilateral operation is preferable to a unilateral one.

In considering the question of absence of the uterus it may be stated at the outset, without fear of contradiction, that complete absence of the uterus has been demonstrated by anatomical proof only in cases of acephalic monsters or foetuses with spina bifida or other malformations incompatible with prolonged life. In all other cases a small bit of tissue, a knob of muscle or band of connective tissue, if nothing more, as representing rudiments of the uterus, has been shown to exist on the cadaver.

From a clinical point of view, a woman possessing such rudiments is as badly off as if she had no uterus at all. I maintain that a small piece of muscle without the shape of a uterus, or a band of connective tissue across the pelvis, cannot be called a uterus either in an anatomical or physiological sense, and such a state of affairs is of interest only from the standpoint of embryology ; therefore we are justified in speaking of women possessing such rudimentary structures as cases of absence of the uterus. The case just reported is an example of a not very rare class—i. e., normal feminine habitus, well-formed hips, breasts, and external genitals, hair of the head long, normal pubic and axillary hair, and feminine voice, with absence of the uterus and more or less atresia of the vagina. These individuals are usually healthy unless the ovaries

are present and functionally active, in which case they suffer from menstrual pains, sometimes so severe as to necessitate oöphorectomy.

Absence of the uterus was first noted by the anatomist Realdus Columbus, in 1572.[7] According to Kussmaul, his observation was defective, and the complete absence of the uterus was not satisfactorily demonstrated. In the succeeding two hundred years the only observations on this subject were made by Morgagni, Morand, and Seron, and they were incomplete. In 1777 William Hill, of Hillsborough,[8] reported an incomplete case of absence of the uterus. He made an autopsy on a woman forty years old who had neither uterus, ovaries, tubes, broad ligaments, nor vagina, but in their place a " cylinder " three inches long and one inch thick. In 1781 Engel[9] published a dissertation on the total or partial absence of the uterus. He first called attention to the rectal touch and catheterism of the bladder as a means of diagnosis, besides studying the anatomy of the subject.

From the beginning of the nineteenth century the reports of cases of absence of the uterus were published with increasing frequency and with greater accuracy of observation. Kussmaul, of Heidelberg, was among the first to publish an extended treatise on the subject and to attempt to explain such anomalies from the standpoint of arrest of development. This treatise,[10] published in 1859, is today the standard work on the subject. Kussmaul investigated the question from an anatomical and embryological point of view, and concluded that absence of the uterus could not be demonstrated with surety on the living woman and that most of the reported cases were really cases of rudimentary uterus; that pathologically there was always some rudimentary tissue to represent the uterus. Many cases of absence of the uterus have been reported in medical literature since Kussmaul's time. The names of Le Fort,[11] who introduced Kussmaul's ideas into France, and L. Fürst,[12] who contributed much to the exact understanding of the embryonic period which corresponded to each of the anomalies, should be especially mentioned in this connection. One of the most recent and complete epitomes of the subject is the graduation thesis of Francis Rossignol,[13] published in 1890.

To get some idea of the frequency of this anomaly I have made a careful study of the literature, using the *Index Medicus*, the Gynecological Index in the early numbers of the American Gynecological Society's *Transactions*, and the *Index Catalogue* of the Surgeon-General's office.

Without aiming at absolute completeness, owing to the inaccessibility of some of the sources of information, I have been able to collect the references to 360 cases of absence of the uterus reported by 239 authors from earliest times up to the present. Roughly, we may say about 300 cases in the last century. Cases occur in the literature of all civilized

countries. I have examined a majority of the 239 references, and have found among them the records of only thirty-five autopsies where this condition was present. Of these, twenty-four were on the bodies of adults and two on girls ten and twelve years old respectively, the rest being on monstrosities and fœtuses with absence of other organs, making prolonged life impossible. In all of the autopsies on the bodies of adults and girls there were noted in every case rudimentary tissues representing the uterus, generally one or two little knobs of tissue the size of hazelnuts or a thin band between the bladder and the rectum.

The ovaries were found to be present in all the cases but six, and five of these were reported in general terms without details, such as "Internal organs of generation wanting." The six cases referred to as having no ovaries were : 1. Case of William Hill, of Hillsborough,[14] already cited. 2. Busch[15] reported a case which Kussmaul thought might be an hermaphrodite. The statement was made that at the autopsy vagina, tubes, uterus, and ovaries were completely wanting. The patient was eighteen years old. 3. Otto[16] reported an autopsy on a twelve-year-old girl who died of a "blue sickness" as the result of grave cardiac malformations. The external genitals were normal, the vagina was very short and terminated in a cul-de-sac, and the internal genital organs were totally wanting. 4. Mary Putnam Jacobi[17] cites a case reported by Hanff where he performed an autopsy on a woman aged fifty-one years who had died of smallpox. The ovaries and tubes were entirely wanting and the uterus was rudimentary. The external genitals were small and undeveloped, like those of a ten-year-old girl. Sometimes the ovaries were found atrophied and sometimes misplaced, but always present except in the foregoing instances. 5 and 6. Lieutaud and Richerand[27] dissected subjects in whom neither the uterus nor its annexed organs were found.

The tubes were present in all cases except six, though often without any canal. The six cases were those of Otto, Busch, and Hanff, and one reported by Boyd.[18] He records the result of an autopsy on an inmate of a workhouse, aged seventy-two years. There was malposition of the kidneys, and the tubes and uterus were wanting, the vagina being represented by a cul-de-sac half an inch deep. The right ovary was normal and the left converted into a fibrous mass. The external genital organs were normal. Also cases reported by Blasius[25] and Blot.[26]

A very large proportion of the reports I have examined are of cases similar to mine—i. e., adult women, feminine habitus, normal external genitals and breasts. A very few cases having abnormal external genitals and the male type of breast, with absence of pubic hair, are reported. The vagina was generally present as a short pouch, though often entirely wanting. Absence of the vagina alone, the uterus being present, is a much more common anomaly than absence of the uterus.

The literature is teeming with published cases of retained menses both from absent vagina and from imperforation of the lower part of the vagina, commonly spoken of as imperforate hymen. So, also, the other developmental defects—double vagina, double uterus, and bicorned uterus—are more common.

In a considerable number of the cases of absent uterus and vagina the urethra has been found to be of large calibre, and in several cases coitus has been practised through it, often without the knowledge of the patient that anything was wrong in this respect. Emmet's case[19] of this sort was one of the earliest and most widely quoted. Most writers hold that the large calibre of the urethra in these cases is due to attempts at coitus, but in view of the fact that there are on record many cases of absence of the vagina in unmarried women of good character where the urethra has been found large—e. g., my case above reported—it seems that the explanation is to be sought rather in some developmental defect. Mary Putnam Jacobi[20] thinks that the large size of the canal extending from the bladder to the vestibule is due to the fact that it is constituted by a persistent embryonic organ, the urogenital sinus, and is not simply the urethra.

The anomaly of absence of the uterus is due to a lack of fusion and subsequent atrophy of the ducts of Müller, a process which ordinarily takes place at the end of the third month of fœtal life. It is well established that these ducts, under normal conditions, fuse in their middle and lower course, the process proceeding from above downward to form the uterus and vagina, whereas above the separate non-fused ducts form the Fallopian tubes. The external genitals, the lower part of the vagina, as well as the urethra and vesical trigone, on the other hand, are formed from the urogenital sinus, and the genital tubercle, furrow, and fold. It is therefore plain why the external genitals are so often found in a normal condition in the same individual in whom the internal organs are wanting or rudimentary, since they are formed from a different set of embryonic tissues. We see also why the vagina is apt to be wanting when the uterus is wanting. A partial coalescence of the Müllerian ducts accounts for the reported cases of double vagina and double and bicorned uterus. The ovaries are in close relation to the kidneys in fœtal life, the kidney being situated much lower down than in the adult. Cases are on record where the ovaries have been found malposed and in their fœtal relation. I have found a considerable number of recorded cases where absence of the uterus was associated with misplaced kidneys. Werth has also noted this association of the two conditions.

The derivation of the hymen is still in dispute. It was formerly held to be formed from the lower end of the vagina, but the many cases of absence of the uterus and vagina where a well-formed hymen exists

would seem to disprove this view. So, also, the absence of smooth muscular fibres in the hymen would tend to show its anatomical dissimilarity to the vagina. Pozzi[21] holds that the hymen is developed entirely distinct from the vagina and is derived from the urogenital sinus. He accounts for the prolongation of the rugæ and pillars of the vagina on to its posterior aspect as a later developmental change. He thinks that complete atresia of the hymen is generally due to a terminal imperforation of the vagina. It is known that the hymen develops late in fœtal life, the nineteenth week, and there seems every reason to believe that it is formed from the same embryonic structure as the vestibular vagina— i. e., the urogenital sinus. Therefore, we should not expect to determine whether it would be likely to be present in any given case of absence of the vagina. As a matter of fact, it is reported as present in a majority of cases, as is also some sort of a vaginal canal. This canal must be thought of as a persistent urogenital sinus rather than a Müllerian vagina, because in the process of development the Müllerian ducts coalesce from above downward. The urogenital sinus develops from below—the urethra and rectum being set off from the vagina— and it is not difficult to understand how, in one case, the lower vagina fails to develop, giving rise to hæmatocolpus if the uterus is functionally active, or, in another case, the uterus and Müllerian vagina being absent, that the urogenital sinus forms a urethra of large calibre and a hymen.

It would seem as if inheritance had something to do with absence of the uterus. Squarey[22] reported the cases of three sisters who had never menstruated, three of whose aunts were sterile. Phillips[33] speaks of two sisters, both married, with congenital absence of the uterus. Nelson[23] reported absence of the uterus in three of a family of five sisters. All three had sexual desires. Of the two sisters with uteri, one had a family of four children, the other was seventeen years old and unmarried. Sexual appetite was present in most of the cases reported. Menstrual molimina sometimes and sometimes not, but generally present where the ovaries could be diagnosticated.

It is seldom that a proper diagnosis can be made without an anæsthetic. The thinness and condition of laxity of the abdominal walls are important factors in determining the accuracy of the examination. In some of the reported cases the diagnosis was confirmed by operation, as in several where oöphorectomy was practised for severe menstrual pains. A diagnosis made in this way is not so likely to be accurate as one made post-mortem, when there is an abundance of time for examination. On account of the large urethra in these cases it is usually an easy matter to introduce a finger into the bladder, thus facilitating the diagnosis.

As to treatment: if there are no molimina, it is a question for the

patient to decide whether she will have an operation or not. It has been maintained by a majority of writers that it is unjustifiable to operate on the unfortunate woman who has no uterus and no vagina. Certainly in my case the patient and her husband were rendered happy by the result of an operation. If we are able to form a vagina that will not close by cicatrization, it seems to me that operation is much more justifiable than it is in cases where the only operative procedure is to make an opening and try to keep it from closing by a plug or packing.

Emmet[24] has reported two cases in which the patient's health became established following operation for artificial vagina, and he quotes Robert Barnes as having noted the same remarkable circumstance.

Where menstrual molimina are severe, oöphorectomy is undoubtedly indicated.

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REVIEWS.

THE reader who opens these volumes is immediately struck with a difference between them and other American and English works on general surgery. It is evident that Dr. Park has endeavored to produce a treatise similar in form to those found in German surgical literature. This is partly done by the use of two sizes of type, which enables the reader to distinguish at a glance the relative importance of the statements, and partly by the incorporation of much material that in American and English works is apt to be omitted; probably on the ground that it is not sufficiently "practical."

The result of this action of the editor has been to give the profession a work of moderate bulk which can satisfactorily be used by the student, and yet serve the surgical specialist as an almost encyclopædic work of reference.

If the articles were all written with the painstaking care and scientific grasp that are exhibited in the chapters on Surgical Pathology and most of the chapters on Surgical Diseases, the book would be an ideal one. This statement is not intended to convey the impression that the rest of the volume is unusually poor; but that the portions indicated are unusually good and of commanding importance.

The aim of the editor to bring the average surgical mind to accept the truth that surgical progress and success are impossible without a knowledge of modern pathology, human and comparative, and of embryology, is clearly demonstrated. It is noticeable, however, that all of the contributors have not been imbued with this spirit, for in some of the chapters there is evidence of either hasty preparation or unfamiliarity with modern pathology and modern surgical practice. This mars the work. The chapters on Shock, Aneurism, and Fractures are good examples of this defect. Let the reader contrast these chapters with the fine dissertations contained in the chapters on Surgical Pathology of the Blood, Diseases Common to Man and the Domestic Animals, Process of Repair, Osteomyelitis, Surgery of the Abdomen, and Hernia, and the statement of the reviewer will be confirmed.

Such irregularities seem inseparable in composite text-books, whether the respective articles be signed by the authors or not, unless the editor exerts the power and takes the time to revise thoroughly every paragraph.

The proportionate authorship of the volumes conveys the impression that the editor perhaps intended to write the whole treatise himself, but, finding the task a great one, concluded to ask the assistance of collab-

orators. He has supplied but three articles in the second volume, while of the first sixteen chapters of the first volume he has written fourteen. It is especially in these articles by the editor that the German method of book-making is conspicuous. The English-speaking profession owes him a debt for bringing so forcibly to its eyes, by contrast, the usual deficiencies of surgical treatises written in English.

The typographical appearance of the book is rather bizarre, because of the excessive frequency with which italics are employed. Clear statements and good rhetoric are usually to be preferred to this eye-catching device, which loses its power by repetition. The illustrations are very uneven in quality; some are extraordinarily good and illustrative; others give no aid to the text and are distinctly undesirable in volumes emanating from a publishing-house of such renown.

The list of contributors contains the names of Park, Belfield, Parmenter, Souchon, Nancrede, Burrell, Gerrish, Eve, Ransohoff, Mudd, Bradford, Dennis, Gerster, Kelsey, Lovett, Matas, Richardson, Bevan, Fordyce, Holloway, C. F. Smith, Parker, C. S. Bull, Etheridge, Delavan, Hardaway, and Blake. Many of these writers are so well known that their statements will be accepted as of high authority.

The sections devoted to the diseases of special organs, such as the eye, ear, and skin, have been written by recognized specialists, who have condensed the material at their command so as to make the articles suitable for admission to a text-book of surgery. The preparation of the section on Anæsthesia has been intrusted to a distinguished writer on therapeutics. This is the plan followed in Dennis's *System of Surgery*, recently issued by the same publishers. The result has been the incorporation in both works of much important information on the physiological action of anæsthetics, of which surgeons as a class are ignorant. In the treatise under consideration it seems, however, as if there was an absence of that definite instruction in the application of drugs to general and local anæsthesia which the student and practitioner of limited experience need. A similar criticism has been made, if the present writer remembers aright, in regard to Dennis's *Surgery*.

It is unusual for two such important works as Park's *Surgery* and Dennis's *Surgery* to be issued by one medical publishing-firm within a few months. Comparison will, therefore, undoubtedly be instituted, and surgical readers will probably gain much by referring to the corresponding chapters in both works. The true value of statements will be thus obtained, since in most instances the writers are not the same. A considerable number of the contributors appear in both works, but only in two or three instances has one author written on the same topic. Some of the plates in Park's *Surgery* are the same as in Dennis's *Surgery;* and in several instances the writers acknowledge their indebtedness for tables and other material to the latter, which is much the larger, as it was also the prior, publication.

The two works are in a way supplementary to each other, and are both necessary to the library of the surgical specialist. Park's *Treatise,* however, will be found comprehensive enough for consultation under most circumstances, and has an individuality so different from other surgical treatises in the English language that it is destined to become very popular. This popularity will be increased by the fact that the purchaser may buy either volume separately, and is not compelled to spend at one time the large sum required to purchase the four volumes

edited by Dennis. The first volume will aid the sale of the second; since it is, the reviewer believes, the more valuable. Would that the truly satisfactory sections in both works had been combined in one publication! Then the American profession would have had the honor of producing a surgery of unrivalled value.   J. B. R.

THE PRACTICE OF MEDICINE. A TEXT-BOOK FOR PRACTITIONERS AND STUDENTS, WITH SPECIAL REFERENCE TO DIAGNOSIS AND TREATMENT. By JAMES TYSON, M.D., Professor of Clinical Medicine in the University of Pennsylvania, and Physician to the Hospital of the University; Physician to the Philadelphia Hospital; Fellow of the College of Physicians of Philadelphia; Member of the Association of American Physicians, etc. Philadelphia: P. Blakiston, Son & Co., 1896.

AFTER a third of a century spent in the assiduous study, practice, and teaching of medicine, and the publication of successful books on various topics, theoretical and practical, the writing of a text-book is not only a proper ambition, but is really expected by students and the profession. So Professor Tyson best shows his modesty by making no apology for the present work. Nor is the work unworthy of the author. Externally, it is the largest and handsomest single volume on the practice of medicine now before the profession. The paper is opaque and not too glossy; the type is clear; "bold-face" and italics aid the eye. The arrangement of subjects follows the common usage, infectious diseases beginning, the various other divisions following, though in an order somewhat arbitrary. Thus, "constitutional diseases" are placed between diseases of the suprarenal capsule and those of the nervous system. Acute articular rheumatism is placed among constitutional diseases, with a foot-note in regard to the probability that it is an infectious disease. Croupous pneumonia is under the diseases of the lungs. No doubt, in a text-book this is most satisfactory. Etiology as transformed by bacteriological discoveries is most conveniently studied along with general pathology. At the same time it would seem well for a text-book on practice to give at least a brief general account of pneumococcus-infection. A section on the symptoms and treatment of poisoning, a table of minimum fatal doses and of maximum doses followed by recovery, and tables of weights and measures, add to the practical value of the book. Matters of diagnostic technique are described in connection with some diseases, as those of the stomach and nervous system. There is a description of the mediastinum, with figures showing the anatomical relations, and an account of the neuron doctrine. In nomenclature convenience has been consulted. Phthisis is used in its common meaning; the classification of kidney diseases is the simplest. An innovation of which we do not see the value consists in placing together hemorrhagic infarction of the lung and septic pneumonia, under the head of Embolic Pneumonia. The various diseases are given space, as a rule, with great justice. In one respect it may be thought Dr. Tyson was too impartial, for the subject of kidney diseases, in which he has long been an expert, might have been treated more fully, even if some other section had to be reduced.

Coming to a more detailed consideration of the text we find much to admire. Medical definitions are difficult, but are of undoubted assistance to beginners, and Dr. Tyson is to be congratulated on the large number he has made, almost every disease being furnished with one. We are surprised that the definition of typhoid fever does not include some mention of the clinical features. The numerous brief historical notes are admirable.

The remarks on etiology are, as a rule, accurate. The mention of Elsner's method for the diagnosis of the typhoid bacillus shows the difficulty of making a book up-to-date on such matters. By the time this book was printed Elsner's method was known to be not so valuable as was at one time hoped. Before the book reached our hands another method for the diagnosis of typhoid fever—Widal's—superior for clinical purposes to that of Elsner's, was being carried out as a routine measure by boards of health in towns the names of which Widal probably never heard and certainly could not pronounce. The important investigations in the etiology of cerebro-spinal meningitis also came too late to be used. Such things are unavoidable. Where information was available Dr. Tyson has used it.

In pathology and pathological anatomy it seems to us the author has limited his space too much. Of course, there are many who do not care for such matters, but it seems as if a little more could have been given with advantage. So, for example, a more minute description of the lesions of typhoid fever and pneumonia, a more detailed account of the causes of bronchitis, and a reference to the ovarian theory of osteomalacia would be welcome.

Clinical features are usually described in a masterly way. In pointing out, as we shall proceed to do, some points on which we differ from the author, it will be seen that the things we criticise are comparatively trifling, and we call attention to them in no captious spirit, but because they are in striking contrast to the rest of the work.

Dr. Tyson applies the term "strawberry tongue" to the condition in scarlet fever in which "the tongue is red at the edges and tip, furred at the centre, but through the fur stand the papillæ in distinct points." Dr. Tyson is in good company here, but the application of the term hardly seems rational. The changes on the tongue, however, are correctly described. The symptoms of ascites as described are said to require seven to ten litres of fluid for their development. Would it not be well to mention more fully the possibility and method of recognizing, sometimes, much smaller quantities? The statement that the "'ovarian cell,' when present in large numbers, is certainly a help to the identification of ovarian fluids" would be more useful if we had a clearer description and a less equivocal picture of the cell and some idea of what is meant by "large numbers." We thought Dr. W. A. Edwards had given the once much-talked-of "ovarian cell" the *coup de grâce*. Dr. Tyson says the sputum in croupous pneumonia is "tenacious, dark red in hue—'prune-juice.'" And again, "the term prune-juice has long been applied to the expectoration of croupous pneumonia, and sometimes when it is thin and dark-hued the comparison is an apt one." This assures us that the preceding statement involves a slip of the pen. Prune-juice is a poor object for comparison, but at all events is not tenacious, so that the first statement should read "light red or yellow— rusty;" the common term "rusty" not being mentioned. No reference

is made to the peculiarities of cases with "prune-juice" sputum. The statement that vocal fremitus is "invariably increased" in pneumonia leaves out of sight the rare cases of massive pneumonia, and the cases with temporary or permanent absence of fremitus from a mucous plug or weak voice, so puzzling to beginners. The description of tuberculous peritonitis is not so full as it should be, in view of the frequency with which that disease is mistaken in practice. We are surprised to find no mention of auscultatory percussion as applied especially to the stomach. Deceptive in some cases, it is, on the whole, a most useful method. Spinal puncture in suspected meningitis is also not mentioned. Bacteriological examinations of pleural exudates, and their prognostic and therapeutic value, seem to deserve some notice.

The subject of treatment is given unusual space, and in many respects is the best part of the book. The directions are full and clear, and, as a rule, eminently judicious and conservative. The author has his fads, but they are old ones, and, therefore, much less dangerous to the inexperienced than are the untested ones that seem so promising, but lead so often to failure. As examples of Dr. Tyson's treatment, we cite the outlines for some important diseases. For typhoid fever the Brand treatment is recommended as best of all, but, as a substitute in cases where it cannot be used, the well-tried expectant symptomatic treatment is described, as carried out by the best authorities up to a few years ago. We note that Dr. Tyson no longer uses calomel in the beginning. If the patient be seen early, a proper dose of calomel can do nothing but good, and even in the later stages this, or what is usually preferable, a simple enema, deserves a stronger recommendation, we think, than Dr. Tyson gives. Since the blessed word intestinal antisepsis, however, has become a trade-mark many think it has no meaning—like the names of proprietary remedies. Of the antiseptic treatment as a routine method, Dr. Tyson justly says it " has not a truly rational basis, while the extravagant claims of its advocates discredit their results." For diphtheria a combination of local antiseptic applications, constitutional treatment, and serum is recommended. The second indication is filled by bichloride of mercury, tincture of chloride of iron, and potassium chlorate. The indications for tracheotomy and intubation might be more explicit, and, for the benefit of the young physician, it might be said that vapor of water from a tea kettle is quite as useful as that from slaked lime. For croupous pneumonia, admitting that "no single plan of treatment dare be recommended," the author speaks highly of the ice-poultice. Opium for pain, and whiskey, strychnine, and ammonium carbonate for exhaustion, are advised. The indications for and against digitalis are well stated. It is a good thing for the profession that Dr. Tyson gives his voice for the well-tried inorganic preparations where iron is indicated. Many recent graduates have an idea that only very complicated and more or less secret preparations of iron can be of any value. The statement that one of the author's cases of hæmaturia "yielded to the electric bath " will probably be looked on by therapeutic skeptics as figurative.

The doses are given in both the old and the metric systems, and, as usual in English books, are translated from the former into the latter. The authors of these books may not expect readers to follow them blindly, but we have observed that those who learn the metric doses in this way either follow blindly or not at all, and the practice seems more

likely to retard than to advance the use of the metric system. Why should a student be asked to remember a dose carried to five decimal places, which a German or French teacher would not take beyond three? If, for example, in giving ipecac, we leave out half a grain, and instead of writing 1.332 write 1.3, will any harm follow? If we think of giving $\frac{1}{20}$ grain of strychnine, shall we write .00324, or may we leave out $\frac{1}{270}$ grain, and write .003? Let us learn and teach our metric doses as such, and not throw unnecessary difficulties in the way.

Dr. Tyson's style is already so well known in medical literature that it is only necessary to say the present work is one of the best examples. Allusions to general literature in prose and verse are encountered occasionally, and even a striking colloquialism is met with, as "the microbes of suppuration *get in their work* and produce a purulent product or an empyema." The usually direct style is occasionally varied by inversion, as "an acknowledged remedy has come to be nitrite of amyl," and "then there is Traube's double sound, in the femoral and popliteal quite often heard." We notice some verbal peculiarities; thus we have "cancerosis," formed, no doubt, after the analogy of canceroma. "Pneumonicosis" for pneumonokoniosis does not seem so justifiable. We fail to see a good reason for the spelling of "eruthrocyte."

Of the inevitable errors of a first edition, we notice the usual number, but these are rarely of a kind to give the reader any difficulty. The so-called mountain-sickness is due, not as stated, to mountain residence (p. 47), but to unwonted exertion at unusual elevations. On page 142 "belladonna" should be "atropia." "The position and size of the prostate will also be ascertained by vaginal examinations" (p. 315), explains itself. Some words have evidently been left out at the end of the second paragraph on page 615. "Gastrodiaphony" (p. 234) should be "gastrodiaphany." "Cellutrifugal" (pp. 794 and 795) should be "cellulifugal." The statement at the bottom of page 640, in regard to poultices, is somewhat mixed.

Dr. Tyson has carried out the plan he has advocated elsewhere of giving the first names of authors cited. Though no doubt an aid in bibliographic research, it hardly seems necessary to write "William" Osler, "William" Pepper, "Hermann" Eichhorst, etc., every time these authorities are named. It was not Philip, but Patrick Manson, who did the great work on filaria, and not Thomas Sutton should be named in connection with arterio-capillary fibrosis, but Henry Gawen Sutton.

There are many useful charts and figures, some of them old acquaintances. The colored plate illustrating blood-cells is well done, but should have the amplifications mentioned. The diagram of blood-corpuscles is not drawn to scale. The index, though well selected, is too short.

We welcome Dr. Tyson's *Practice* as a most valuable addition to medical literature. It finds strong and active competitors, but there is plenty of room for it, and we are quite certain that within a short time the call for a second edition will enable the indefatigable author to correct such errors as we have mentioned.   G. D.

A Manual of Clinical Diagnosis by Means of Microscopic and Chemical Methods, for Students, Hospital Physicians, and Practitioners. By Charles E. Simon, M.D., late Assistant Resident Physician, John Hopkins Hospital Baltimore. With 132 illustrations on wood and ten colored plates. Philadelphia and New York : Lea Brothers & Co., 1896.

On reading the preface of this work one is almost led to believe that the author lacks one of the requirements that Matthew Arnold says a good author should possess, viz., soberness. We quote the opening sentence : "It is curious to note that, notwithstanding the great importance of clinical chemistry and microscopy, but little attention is paid to these subjects, either by hospital physicians or by those engaged in general practice. This lack of interest is referable primarily to the fact that a systematic study of these branches has hitherto been greatly neglected, not only in American medical schools, but also in those of Europe." Again : "It is inconceivable that a physician can rationally diagnosticate and treat diseases of the stomach, intestines, kidneys, and liver, etc., without laboratory facilities." We believe these statements are unwisely put here : first, because they are not strictly true ; and, secondly, because, if true, they antagonize at the outset an audience of presumably intelligent hospital physicians and private practitioners. We suggest that if the paragraphs were modified they would be closer to the truth and not so offensive to oversensitive physicians, who might dislike to be told that they showed a great lack of interest in, or paid little attention to, these matters of prime importance—"these unjustly neglected subjects ;" and the sentences would possess more of Matthew Arnold's quality of soberness. Would they not better read : "It is gratifying to note that more and more attention is paid by hospital physicians and those engaged in general practice to two subjects of great importance, clinical chemistry and microscopy ?" "While physicians can often successfully diagnosticate and treat some diseases of the stomach, intestines, kidneys, and liver, etc., without laboratory facilities, there are many diseases of these organs that can only be rationally diagnosticated and treated with the aid of a laboratory ?"

One is gratified, however, to find in the body of the book few rash statements. Conclusions are not hastily reached. New methods whose value is not yet fully established are advocated with caution. Methods of others are fairly described, even though not sanctioned as the best by the author ; yet the book is not lumbered up with a rehearsal of obsolete or impractical procedures that might be placed in a complete treatise on clinical diagnosis, but would be confusing in a work of this scope.

We can best show the ground covered by quoting the author's own words : "Chemical and microscopic methods are described in detail, so that the student and practitioner who have not had special training in such manipulations will be enabled to obtain satisfactory results. The subject-matter covers the examination of the blood, the secretions of the mouth, the gastric juice, feces, nasal secretion, sputum, urine, transudate, exudate, cystic contents, semen, vaginal discharges, and milk. In every case a description of normal material precedes the pathologic consideration, which latter in turn is followed by an account of the methods used in examination."

The book is fitted for laboratory work, being eminently practical. It contains the best of von Jaksch, Neubauer and Vogel, Ehrlich, Hayem, Ewald, Boas, and others. But one readily sees that Simon has himself gone over the ground, so that the work is more than a mere compilation; it shows judicial selection based upon personal practical experience, and in many places we find the results of original work recorded, as on page 158 (Indicanuria), page 401 (Ehrlich's reaction), page 352 (nucleo-albuminuria). The style is clear and concise.

To the Blood there are devoted nearly seventy pages. The chemical and microscopical examination of the normal blood is carefully considered, as well as that of pathological blood. Of particular value is the clear classification of leucocytes (after Ehrlich), with the various formulæ for stains. The bacteriology and parasitology of the blood are also taken up, and the importance of the examination in suspected sepsis, glanders, malaria, etc., briefly but plainly set forth. The caution of the writer is seen in his statements regarding the fate of the sporules after segmentation of the plasmodium malariæ, when he says: "The ultimate fate of these little bodies is as yet unknown, but it is likely that they in turn invade new corpuscles, etc." (page 81). The same freedom from dogmatizing concerning still unsettled questions is seen in his discussion of the nature of the malarial crescents. The differential table of the more important diseases of the blood (page 85) will be found valuable for reference. There is always a danger, however, that a student will misuse such a table, and will try to make it supply the place of text. No table can be profitably studied or rightly understood unless there has been previous study of the text.

The value of serum-diagnosis of typhoid fever has been established too late for insertion in this volume, and may justly be regarded as still, in a measure, on trial. Possibly the author regards Neusser's granules as of doubtful value in diagnosis, and has omitted reference to them on this account. A mention of them would not, however, have been out of place.

The subject of the bacteriological diagnosis of diphtheria is ably discussed and the technique fully described. Personally, we have found it easier, particularly in the case of nervous children, to use a sterilized cotton swab, that is carried in a sterile test-tube, in place of the forceps or platinum loop advised by Simon.

The subject of the Gastric Juice and Gastric Contents occupies about sixty-five pages. Discretionary judgment has been shown in excluding much material that might have been inserted here, but which would have served rather to confuse than otherwise. The few tests believed by the author to be the most reliable and the simplest are clearly described. That the chemical examination of the gastric contents is still in a somewhat chaotic state, and that one should not place too great reliance upon present methods and conclusions, is shown by the constantly changing relative value of tests. Thus Simon points out that since Schreiber's researches one can diagnosticate hypersecretion only when from 100 to 1000 c.cm. of pure gastric juice can be obtained from the non-digesting stomach (page 101). He believes that the phloroglucin-vanillin test of Günzburg is to be replaced by Töpfer's dimethyl-amido-azo-benzol test, which is as easy of application, more delicate, and can be made use of in a quantitative examination. His experience also with Uffelmann's test is that it is rather uncertain. Boas's test-meal, Boas's test

for lactic acid, and his conclusions as to its significance as indicating carcinoma are indorsed. It should not be forgotten, however, that adverse opinions as to the diagnostic value of the finding of lactic acid based upon careful tests, and later post-mortem examinations, are not lacking. As further showing the changing views regarding the stomach may be mentioned the fact that Simon, with others, regards the organ as bactericidal rather than digestive in function.

We are glad to see the composition of a normal solution of sodium hydrate plainly set forth, and not assumed as known (page 104). While physicians ought to know its composition or to be able to figure it out from a knowledge of chemistry, it is a fact that many have forgotten it, and the writer has known more than one student and practitioner who has gone through page after page of index and text in works on chemistry or diagnosis in a vain hunt after the composition of the solution in question.

What is known concerning the examination of the feces as an aid to diagnosis is given in the next chapter. In reading that a stool may occur "only every two, three, or four or more days, or even weeks or months" (page 175), and of the case "in which only four stools occurred in one year" (page 160), we are reminded of the case mentioned by Catullus, in which there occurred but "ten stools a year, and these harder than a bean." As the man was an enemy of Catullus, possibly the case ought not to be quoted as thoroughly reliable. And we are glad to see that another illustration of the laxative effect of psychic influences, of nervous worry and excitement, has been brought forward. The soldier who unconsciously has a bowel-movement during the excitement of his first battle has done duty long enough. The diarrhœa of the student before examination takes the place of the time-honored soldier (page 203).

From the chapter on the Sputum we quote the following: "When working with sputa which are known or suspected to be of tubercular origin the greatest care should be exercised to keep the expectoration from drying and becoming disseminated in the air. Negligence in this respect may result in the most serious consequences" (page 212). This we most heartily indorse. Its importance in the mind of the author is shown by the fact that the words are in italics. We might add that the same care should be exercised with pneumonic sputa, and with urine or feces suspected of being tubercular. The point is well made (page 236) that the presence in the sputum of pneumococci is not absolutely pathognomonic—i. e., of croupous pneumonia. Also, that there is nothing in the appearance of the sputum in phthisis that is characteristic, the appearance varying with the stage of the disease, its extent, the existence of complications, etc. (page 236).

The subject of the Urine receives ample treatment, nearly one-half the book being devoted to this topic. We can merely refer to a few points.

As worthy special commendation is the clear exposition of the changes that take place in a normal urine when allowed to stand at an ordinary temperature (page 240). Also the very complete discussion of the specific gravity of the urine (page 247), of urea (page 287), and of Ehrlich's reaction. Jaksch is justly criticised for his description of this reaction and his imperfect conclusions based upon his imperfect method (page 401). The exposition of how much may be learned from a carefully made nitric acid test is unusually clear (page 354).

The author's views upon albumin are of interest. "The presence of albumin in every case is a pathologic phenomenon" (page 336). "A transitory, intermittent, and cyclic albuminuria is not infrequently observed in apparently healthy individuals; but the facts so far brought forward do not warrant the assumption that such forms of albuminuria are physiologic" (page 338). "Albuminuria may be regarded as a constant symptom of typhoid fever" (page 342). "A purely renal nucleo-albuminuria—*i. e.*, an elimination of nucleo-albumin from the blood through the kidneys—does not exist" (page 353). "According to Kühne's definition of peptones, a peptonuria hence does not exist" (page 350). The trichloracetic acid test is "undoubtedly the most delicate of those so far described, but not so delicate that a trace of albumin or nucleo-albumin, as has been suggested by some, can be demonstrated in every urine" (page 359). "As far as the existence of a cylindruria *sine* albuminuria is concerned, the author must confess that he is rather skeptical as to the actual occurrence of such a condition" (page 450). The reviewer believes he has seen such a case. And he further believes that in almost every urine a solitary cast or two can be found, if the urine be allowed to stand for twenty-four hours in a sediment-glass, if the sediment is centrifugalized and this second sediment examined microscopically. This, it will be observed, is the refinement of sedimentation.

We regret to see on the part of most authors a persistent refusal to include in the tests for sugar that of Haines, of Chicago. His modification of Fehling's test is the best routine test, because easiest of application and because the solution is stable.

The book is neatly gotten up, and the illustrations and plates, many of them original, are in general excellent. A few proof-reading errors will be corrected in a later edition. We hesitate to criticise the taste of the medical publishers, who stand at the head of their profession in this country, and in so doing we may show a lamentable ignorance of things typographical and an uncultured taste; but we cannot refrain from saying that the style of letter " f " employed is not to our liking. It seems to stand out on the printed page like a wry-neck or hump-back in a crowd. And if they will use a crooked " f", why not be consistent and crook it also when they use " fi " and " fl " ?

After carefully looking over this work we believe it is destined to become a standard class-room work. As it goes through subsequent editions it will be shaped more and more to practical laboratory work, and will be found upon the desk of the worker in clinical medicine as is Gray's *Anatomy* or Heath's *Dissector* upon the dissecting-table of the student of that subject.   J. B. H.

OPHTHALMIC OPERATIONS AS PRACTISED ON ANIMALS' EYES. By CLARENCE A. VEASEY, A.M., M.D., Adjunct Professor of Diseases of the Eye in the Philadelphia Polyclinic, etc. Philadelphia: The Edwards & Docker Co., 1896.

THIS little book, of about 100 pages, 12mo., well printed in large type, and fully illustrated with cuts of the instruments required and the manner of using them, covers ground not before occupied. Even

one by no means devoid of the power to adapt an operation to the conditions of the particular case will find the practising of operations on the eyes of lower animals made easier by following descriptions especially adapted to such practice, instead of having only the descriptions of these operations as they are to be practised on the patient, which are found in works on ophthalmology.

The descriptions here given are clear, brief, and to the point; and numerous hints are included which a good teacher would be likely to give to his student, but for lack of which he who studies alone may be at a serious disadvantage.

Operations on the lids have been omitted as being best practised upon the cadaver rather than on the eyes of the lower animals. These, with operations upon the lachrymal passages, and some of the more common modifications of the operations that have been here described, might, we think, have been included with advantage. Perhaps, too, some addition to the matter would have lessened the need of spreading it so much by the use of very large type, although large type is quite desirable in a book which may be used for reference while the operations are being practised.   E. J.

DIE INFECTIONS-KRANKHEITEN. IHRE ABWEHR UND UNTEDRÜCKUNG. Von DR. HEINRICH BERGER, Kgl. Kreisphysicus in Neustadt a. Rhbe. (Hannover). Brauschweig: Friedrich Vieweg & Sohn, 1896.

INFECTIOUS DISEASES; THEIR PREVENTION AND SUPPRESSION. By DR. HEINRICH BERGER.

THIS little book " is intended to serve as a guide to all who labor for the welfare of mankind, so far as the infectious diseases are concerned." So we are told in a brief announcement by the publisher, who also states that before laws regarding these diseases can be made effective instruction is necessary concerning the infectious diseases. Suitable laws and adequate instruction are therefore the subjects of the work. Considering the difficulties inherent in these subjects, the work must be said to be well done. It is intended more for intelligent laymen, such as teachers in schools, superintendents of asylums, and practical hygienists, but from the convenience of its arrangement may be found useful by physicians, health-officers, and others to whom the details are already familiar.

The matter is divided into a general and a special part. In the former are discussed such topics as the conception of infectious diseases, the possibility of their successful control, classification, international and national, local and individual preventive measures, public and private hygiene, the recognition of infectious diseases, notification, diagnosis, protective measures, indemnification, punishment. As an appendix to this part the author submits the scheme of a law for the control of infectious diseases.

In the special part there are descriptions of all the infectious diseases, including those acquired from animals and the parasitic skin diseases, showing the symptoms, cause, mode of entrance, and methods of prophylaxis. These features are also arranged in tabular form at the end of the work.

The author's method is a good one, and his knowledge on the whole accurate. The plans proposed for lessening the spread of infectious diseases are usually admirable, though often of a kind not readily carried out in countries where the liberty of the subject is cherished more than the preservation of health, and, as the author admits, require a more rigorous control of " healers " than is now possible in any country. The instruction of teachers in the elements of hygiene and the teaching of the elementary facts regarding infectious diseases to the masses are urged. The author doubts the wisdom of trying to instruct children, as is now done, by teachers without proper understanding of the subject, but would prefer to have the teachers prepared to instruct, rather than allow physicians to do that, as some have proposed.

Altogether, the book is a readable and suggestive one and may do much good if it reaches those for whom it is intended.   G. D.

THE JOHNS HOPKINS HOSPITAL REPORTS. Volume V. Baltimore: The Johns Hopkins Press, 1895.

FOR importance of the subjects treated, and for mode of presenting the matter, this volume is difficult to equal. More than 200 of its 500 pages are taken up by the article of W. S. Thayer and John Hewetson, on The Malarial Fevers of Baltimore. This modest title does not indicate the real scope of the article. Much of it is devoted to the analysis of 616 cases of malarial disease studied from the modern point of view in the Johns Hopkins Hospital from June, 1889, to August, 1894. But besides this, the whole subject of malaria is treated in a manner deserving the highest praise. Based on a larger experience than that of Mannaberg, the author of a valuable monograph published three years ago, the American authors have approached the various problems in a more objective manner than did the previous writer. The development of our knowledge of the malarial parasites, the methods of examination, the clinical features of the disease, and the various theoretical problems involved are all discussed, briefly but with admirable clearness. The list of references contains 359 numbers. The illustrations, " made in Germany," are more accurate and more artistic than any hitherto published of the malarial parasites.

This paper is followed and supplemented by a Study of Some [four] Fatal Cases of Malaria, by Lewellys F. Barker, illustrated by four excellent plates. Together these form a treatise on malaria that should be widely studied. The business-like description and careful observations might serve as a lesson to those who, without either experience or observation to speak of, still oppose or ignore such facts as are here accumulated. The way in which light may be shed on puzzling cases in practice should be taken to heart by all who are struggling with obscure ailments in which malaria is thought to be a factor and which can surely be elucidated by such methods as are here detailed.

The rest of the volume is devoted to Studies in Typhoid Fever. This contains a General Analysis and Summary of the Cases, Special Features, Symptoms, and Complications, Five Years' Experience with

the Cold-bath Treatment, Neuritis during and after Typhoid Fever, Chills in Typhoid Fever, and A Study of the Fatal Cases (continued), all by Dr. Osler; Pyuria in Typhoid Fever, by George Blumer; Certain Forms of Infection, by Dr. Flexner; An Investigation into the so-called Lymphoid Nodules of the Liver, by Dr. Walter Reed; Post-typhoid Bone-lesions, by Harold C. Parsons.

This notable group of articles should be widely read as a commentary on some of the most important features of a most important disease, and as a record of some rare conditions in it, abstracts of which would do justice neither to authors nor to readers.

The volume is well printed on thick paper, and contains, besides the plates mentioned, a large number of charts.   G. D.

ÆTIOLOGISCHEN STUDIEN ÜBER LEPRA. By DR. EDWARD EHLERS, Instructor in the University of Copenhagen. Pp. 64, with 22 illustrations. Berlin, 1896.

ETIOLOGICAL STUDIES ON LEPRA.

THE investigations of Dr. Ehlers were conducted mainly in Iceland, but in the brochure before us the disease in its etiological bearing is discussed from a general point of view, including all the more important theories that are held in various countries where leprosy is endemic. The author does not believe in the theory advanced by Zambaco Pascha, that lepra mutilans and Morvan's disease are identical. He concludes from his studies that autochthonous lepra does not exist, there being no proof in substantiation of this view. Zambaco Pascha has proved what Neisser before him showed to be the case, namely, that leprosy still exists in France; but the proof of its autochthonous existence is wanting. It is impossible to state positively that a person has never been in contact with a leper. To-day the dangers of contagion are as great as in the middle ages, and many Europeans contract leprosy by travelling in countries where hygiene and sanitary measures are not practised as they are in Europe and in the United States. As concerns the inhabitants of Bretagne, France, it must be remembered that they are in close relations with the people of Iceland, for every year, the author states, not less than 4000 fishermen from Bretagne frequent the west coast of Iceland. He contends that the disease is contagious; that heredity plays no part in its production; and that Armauer Hansen (the discoverer of the bacillus lepræ) was right in unhesitatingly putting forth these views.

The brochure, which can be highly recommended, is illustrated with a number of photographs showing the several varieties of the disease in different stages, and there is much clinical material in the shape of notes of cases, all in a condensed form, with special reference to etiological questions. It should be in the hands of all who are interested in matters pertaining to sanitary legislation and hygiene.   L. A. D.

PROGRESS

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

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Antistreptococcal Injections in Scarlet Fever.—DR. YOT reports their successful use in a single instance. While it cannot be affirmed that recovery would not have taken place without these injections, yet it is no less true that after each injection there was an amelioration of the symptoms, which could not have been a simple coincidence. Under similar circumstances the author would not hesitate to employ them, nor would he wait until the patient was profoundly infected. Although a trifling abscess appeared in spite of all antiseptic precautions, this fact should not lessen our opinion of the advantages of the treatment.—*Journal des Praticiens*, 1896, No. 52, p. 823.

The Anticoccal Therapeutic Serum.—MME. N. O. SIEBER-CHOUMOWA states that since the immunization against staphylococci and streptococci is obtained only through living cultures, and not by filtered and sterilized toxins, it is necessary to observe caution in drawing the blood, in order to obtain a serum which shall be both curative and harmless. A preliminary bleeding must be made and the results thoroughly tested. After pointing out the danger of increasing *ad libitum* the quantity of cultures injected into the horse, so that the serum shall be of the greatest possible strength, the author proceeds to say that the serum obtained from the goat has never given rise to disagreeable consequences, as eruptions or painful sites after injection, although used in considerable quantity. Goats can be advantageously used for the manufacture of these serums, because they bear well the injections of living cultures and micrococci, and are also resistant to infection. Besides, it is less expensive to sacrifice a goat, than a horse, by a too rapid process of immunization. As to what extent we may hope to obtain a curative action from these serums many interesting observations are cited. We know that the serum of animals immunized against certain microbes is preventive against other microbes, so that the action of a serum is not always specific. For instance, the antitetanic serum is active against the poison of serpents.

The serum of animals immunized against symptomatic malignant pustule acts upon the bacillus of acute septicæmia. In certain cases human as well as equine serum possesses a preventive action against cholera. Notwithstanding these observations we have a right to demand that these serums shall have a specific action against pure infections, and as well against mixed infections marked by the presence of some one or other of these cocci as complications. Under the latter division come pyæmia, septicæmia, septic forms of diphtheria, erysipelas, phlegmons, osteomyelitis, and analogous infections. It is likely that the still-debated question concerning the identity of various species of streptococci will soon be solved from the standpoint of immunization. It is also of interest whether the serum of animals immunized by erysipelatous streptococci acts with the same power against the processes set up by other species of streptococci. Of the special work detailed may be mentioned the immunization of a rabbit to streptococci from angina; two goats to streptococci; a goat to staphylococcus aureus; two horses to streptococci—one, however, succumbed before complete immunization was obtained.—*Archives des Sciences Biologiques*, 1896, No. 5, p. 415.

Antirabic Vaccinations at St. Petersburg.—DR. V. KRAIOUCHKINE reports that of the patients treated 13 abandoned it of their own accord; 11 were not bitten, but fresh wounds had been exposed to the saliva of rabid animals; 7 had been bitten by animals which were not suffering from hydrophobia, and 2 were treated because they feared the results of drinking milk from a rabid cow. Of the 269 persons treated, all were bitten by dogs (205 upon uncovered portions of the body) excepting 21. Of these, 12 were bitten by wolves and 9 by cats. Of the whole number, 2 died. The first, a man thirty-five years old, was severely bitten by a wolf, terribly lacerating the face, and inflicting three tears upon the left hand. The wolf was proved to have suffered from hydrophobia by a post-mortem examination made by a veterinary surgeon. Treatment was commenced two days after the injury and continued for twenty-four days. Two days after his discharge he was attacked with hydrophobia and died two days later. The second, a boy, aged eighteen years, received seven penetrating wounds upon the right hand from the bite of a dog. There was suspicion, but not proof, that the dog was mad. Seventeen days later treatment was begun. On the eleventh day of treatment the patient complained of a pain in right shoulder, hand, and fingers. The next day there were difficulty in swallowing and general nervous irritation. The treatment was now suspended and two drachms of serum from an immunized rabbit were injected, and on the following day the patient died.—*Ibidem*, p. 476.

The Action of Tuberculin.—M. A. LOESCH, from extended experimentation, reaches the following conclusions: (1) The blood-reaction with tuberculous animals is more apparent than the temperature-reaction. (2) After an injection in tuberculous animals, at the end of from two to four hours there is diminution of the number of white corpuscles; in healthy animals there is no diminution. (3) In tuberculous animals the leucocytosis is at a maximum, not upon the next day, as with healthy animals, but at the end of two days after injection. (4) With healthy animals the temperature is elevated

after injection a degree or more; but a single elevation of temperature does not determine the existence of tuberculosis. (5) With normal guinea-pigs, after injection, at the end of one or two hours the temperature sensibly rises; but it rapidly falls, so that in five or six hours it becomes normal. With tuberculous individuals the diminution of the number of leucocytes after an injection of tuberculin is a general phenomenon.—*Ibidem*, p. 483.

The Artificial Antitoxin of Diphtheria.—M. G. A. SMIRNOW describes the process as follows: the toxin (serum or bouillon) is placed in a U-tube at the base of which is a cock, so that the products formed at the positive and negative poles may be separated. In each opening is placed a platinum electrode, through which is passed for a certain time the constant current. At the positive pole the reaction is acid, and we find the acid radicals of the salts, principally the phosphates; at the negative the reaction is alkaline, and we find the metals and bases. The cock is now closed and the excess of acid and alkali neutralized, when it will be found that the solutions have not only lost their toxic, but have acquired curative properties. The great advantage of this antitoxin is its cheapness and its easy and simple preparation. It seems, then, that the preparation of an active, specific remedy for diphtheria is not the exclusive monopoly of the animal organism. The conclusions are: (1) That antitoxin is only a poison which is oxidated or hydroxidated. (2) That the electric current is not a specific force, producing under these conditions an antitoxin, but this is the result of the reciprocal action of the organic substances of the diphtheritic bouillon and the products of the electrolysis of the added salts—*Ibidem*, p. 502.

Syphilis and Antitoxin.—MR. A. W. FINCH NOYES, JR., cites as reasons for the belief that acquired syphilis is produced by a particulate virus, probably a microphyte: (1) The inoculability of the disease, transmission always taking place either by direct contact or by mediate communication. (2) The presence of an initial lesion at the point of contact, in this resembling other inoculable diseases of microbic origin. (3) The diffusion of the disease from the originally infected focus through the system as a disease due to a particulate virus would be distributed—*i. e.*, through the lymphatic vessels—both of which retain some of the infecting element, and finally into the blood-stream. (4) The protection produced by a single attack. (5) The immunity without the previous occurrence of the recognized symptoms of syphilis, observed in mothers who have borne syphilitic children. The filtration of small doses of toxin through the placenta from the syphilitic fœtus sufficient to produce partial or complete subsequent immunity, but not sufficient to produce symptoms of syphilis at the time, may explain this clinical observation. It is an interesting scientific fact that the serum of the fowl, which is naturally immune to tetanus, cannot produce immunity in susceptible animals; but if a dose of tetanic toxin be given, the serum immediately assumes antitoxic properties. Acting on this analogy, antisyphilitic serum has been prepared by previously injecting immune animals with syphilitic serum. Six patients have been treated with the serum thus prepared—one in the earliest stage, as soon as the primary sore was recognized; two during the secondary stage; and three in the tertiary period. The results were vari-

able; the influence was more marked in the tertiary lesions, less marked in the late secondary manifestations, and practically *nil* in the early secondary and primary cases; in fact, it was in inverse ratio to the activity of the disease, or, in other words, to the activity of the toxin which it was sought to neutralize. The serum does not seem to produce anything more than a local immunizing effect; it produces no constitutional immunity, as evidenced by the recurrence of lesions after the discontinuance of the injections. Whether antisyphilitic serum, as now prepared, will find any place among reliable therapeutic agents is still *sub judice*. That it may do good is possible, especially in those cases which are intolerant to mercury and iodides. Apart, however, from the utilitarian aspect, it is of some scientific interest that a serum should be obtainable which exerts the influence shown in some of the cases reported in this paper.—*Intercolonial Medical Journal of Australia*, 1896, No. 11, p. 635.

The Treatment of Tic Douloureux.—Dr. William Ewart cites the following indications: (1) The sedative; sleep being the first essential and the basis of the entire treatment. It is necessary that the narcotic prescribed shall be sufficiently strong to procure prolonged slumber. Chloral and morphine combined will usually prove effectual. (2) The restorative; this includes mental and bodily rest and suitable alimentation. Rest in bed is indicated in all severe cases until remedies have taken effect, and the success of treatment may largely depend upon this means of economizing nerve-energy. Alimentation needs to be adapted to the irritable state. The tenderness of the mouth and its unhealthy state, the feeble and faulty digestion, call for a careful selection and for a progression in diet. The object is to raise the nutrition without overloading the blood with nitrogenous waste. A liberal supply of vegetable foods and a moderation of the nitrogenous are generally indicated. Alcohol is to be avoided, but in enfeebled and underfed subjects stout or even port wine may be allowed as a temporary help to nutrition. (3) The alterative; in genuinely gouty cases this may be directed toward the gout, but with careful avoidance of any depressing agents. Generally, methods which favor absorption as well as glandular activity (particularly that of the liver) will meet the gouty as well as the general indication. The salicylates, benzoates, sulphur, ammonium chloride, and taraxacum are available, but probably do not equal in efficacy the salts of iodine and of mercury, and particularly their combination in the proportion of twenty to thirty minims of the solution of corrosive mercuric chloride (1 to 960) and of six to ten grains of potassium iodide. The latter may be used alone, but in sufficient doses, and its action seems to be promoted by the addition of tincture of iodine in fifteen to thirty minim doses. As a useful adjunct guaiacum has been prescribed, but, if used, should be administered separately. These drugs act both by relieving vascular tension and also favorably upon glandular and general metabolism and upon absorption. (4) The tonic; these measures are less dependent upon drugs—although the vegetable tonics may be used with advantage—than upon hygiene, and, above all, upon muscular exercise, which has the advantage of diverting energy from the oversensitive nervous mechanism while raising the general nutrition. Muscular work should be at first passive and only gradually increased. Ordinary massage may be applied

at an early date after the needful long sleep has been obtained, and should be gradually replaced by the "resistance-movements" and in suitable cases by Swedish gymnastics. Salt baths may be combined with this treatment, which by diverting the circulation to the skin and muscles would tend to relieve the nervous system.—*British Medical Journal*, 1896, No. 1873, p. 1496.

The Treatment of Cerebro-spinal Meningitis by Hot Baths.—DR. M. JEWNIN reports five successful cases. Noting the reports of Aufrecht (one case) and of Woroschilsky (two cases), he details his own. The temperature of the daily bath varied from 99.5° to 104° F., but the duration was not stated. So far as this report shows anything, it may be said that these baths are harmless, and, further, that they quiet the patient. It is also to be noted that whereas most authors call attention to the great emaciation which results from the disease, so that in this respect it recalls tuberculosis or carcinoma, under this method there was no marked loss of weight, but, on the contrary, three of the five made a distinct gain.— *Therapeutische Monatshefte*, 1896, Heft 11, S. 581.

The Effect of Tuberculin in a Case of Tuberculous Meningitis.—M. E. MOURANGE reports an instance of the use of this remedy. From this it is difficult to arrive at any conclusion. The injection of a very minute dose after complete coma had persisted for twenty hours was followed by spontaneous movements, ability to speak, and recovery of consciousness. On the next day the paralytic phenomena, the deviation of tongue and face, the pupillary inequality, and ptosis disappeared. The continence of the sphincters was regained to the extent that an enema was retained for an hour and then expelled with feces, and that there were three voluntary urinations. On the following day the patient seemed to be cured; but later in the same day fever reappeared, with pain and swelling in the left buttock, and the patient died upon the following morning. It is doubtful if this primary improvement could have been a coincidence, for the injection was followed by prompt febrile reaction, and the swelling was doubtless due to the awakening of an old tuberculous focus It seems fair to believe that had the patient not been enfeebled by fifteen days of illness prior to the injection the result might have been different. The intensity of the resulting febrile reaction from the peri-anal phlegmon contributed to this result rather than did the cerebral lesion.—*Gazette hebdomadaire de Médecine et de Chirurgie*, 1896, No. 89, p. 1057.

Pellotin.—DR. ALEXANDER PILCZ has noted the necessity for a hypnotic which can be administered by hypodermatic injection. This is an alkaloid obtained from the Anhelonium Williamsii, which occurs as a white, amorphous, intensely bitter powder of slight solubility. Of this the chloride ($C_{13}H_{19}NO_3HCl$) is readily soluble and does not give rise to local irritation. The author has employed the drug in fifty-eight cases, generally in the dose of one-third of a grain, although it is best, on first trial, to use one-half of this quantity. Of these cases 50 per cent. showed satisfactory results; in over 29 per cent. the result was moderate, and in nearly 21 per cent. failure ensued. If the patient fell asleep in from one-half to one and one-half

hours after injection (nine o'clock in the evening), and remained asleep the entire night, the result was deemed to be satisfactory. Only two patients complained of nausea and heaviness of the head, and one of these was a paranoiac who had shown various hallucinations. Collapse was not observed.— *Wiener klinische Wochenschrift*, 1896, No. 48, S. 1121.

The Action of Apolysin.—DR. V. GEZ has made use of this remedy in the treatment of 50 patients: croupous pneumonia, 2; syphilis, 1; scarlatina, 1; pleuritis, 5; muscular rheumatism, 11; hemicrania, 5; angina follicularis, 1; caries vertebræ, 1; articular rheumatism, 5; neuralgic pains, 10; lumbago, 3; septicæmia, 1; tabes dorsalis, 3; typhoid fever, 1 case. Of these, 9 are reported in detail. The daily dose was from forty-five to one hundred and five grains. He concludes that this is an indifferent pharmaceutical product which possesses no analgesic and but very slight antipyretic and diuretic properties.— *Wiener klinische Wochenschrift*, 1896, No. 22, S. 466.

The Physiological Action of Solanum Carthineuse.—DR. E. Q. THORNTON has experimented with soft extract administered by the mouth and hypodermatically to frogs. In thirteen experiments he found that the drug depresses respiration, has little or no effect upon circulation, depresses the cerebrum, and stimulates the cord. It can be administered to a healthy man in single doses of thirty grains or daily doses of sixty grains, without the production of apparent effects.— *Therapeutic Gazette*, 1896 No. 11, p. 722.

The Treatment of Cardiac Diseases by Mechanical and Hydro-mineral Methods.—M. ERNEST BARIÉ states that the general results of Oertel's method are: (1) Increase in the activity of combustion with diminution of the fat-excess in the entire economy, and in particular in the heart. (2) Increase of cutaneous excretion and aqueous exhalation from the lungs, with disappearance and elimination of œdema and local dropsy. (3) Increase of the contractile energy of the myocardium, re-establishment of equilibrium of tension between the arterial and nervous systems, and, consequently, regulation of the course of the blood. This method is of absolute utility in certain well-compensated cardiac lesions, in cardiac neuroses, and especially in obese patients who are hearty eaters. It should be forbidden in recent endocarditis, true angina pectoris, advanced arteriosclerosis, in lesions of the valves and orifices, in hyposystole, with much stronger reason in the asystolic period, in degenerations of the myocardium, and in aortic aneurism. The altitude-method, provided that it is rigorously watched, may perhaps give as good results as the preceding. The limit of about three thousand feet must not be exceeded, and with the appearance of the slightest contra-indications absolute rest;—dorsal decubitus must be insisted upon until the patient is able to descend to a lower level. Gymnastics and certain bodily exercises may be very properly recommended. These may diminish the blood-stasis in the venous system and pulmonary vessels, diminish the obstacle to the flow of blood in the systemic circulation, and facilitate the work of the left ventricle and strengthen the heart-muscle. They are contraindicated in asystole, aortic aneurisms, fatty degeneration of the heart, and advanced arteriosclerosis. Among the physical exercises the use of the bicycle at

the present time occupies the first place. The conclusion is reached that this may be permitted to some, but absolutely forbidden to others. The condition of the arteries must be examined, and it goes without saying that advanced arteriosclerosis, atheromatous arteries, and aneurismal dilatations are absolute contraindications. Massage applied with gentleness may be of real service if rough friction upon the œdematous limbs be avoided, which may cause erythema or excoriations which are likely to slough. As for baths, we must not forget that the entrance into even a tepid bath with these patients often occasions a marked sensation of oppression. The bathing must be watched, and at the outset only baths of short duration and of temperature near the body-norm employed. For all that, with few exceptions, a cure of rheumatic endocarditis is not known; yet it is beyond question that certain waters, as those of Nèris, of Plombières, and perhaps more especially those of Bagnols (Lozère), render real service to rheumatic patients who suffer from cardiac affections, particularly if they are young subjects or those whose lesions are recent. It is likely that these thermo-mineral waters place the patient beyond the influence of new rheumatic attacks and oppose, up to a certain point, the pre-established cardiac lesions.—*La Médecine Moderne*, 1896, No. 93, p. 705.

MEDICINE.

UNDER THE CHARGE OF

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The Dorsal Test for Pericardial Effusion.—EWART (*British Medical Journal*, January 23, 1897) describes a quadrilateral-shaped, dull area at the posterior thoracic base in cases of pericardial effusion, which he thinks is of material aid in diagnosis. It was referred to by him in an article in the same journal on March 21st of last year. He terms this area the "pericardial dull patch." Vertically, it extends from either the ninth or tenth rib, according to the amount of the effusion, to the twelfth rib, and horizontally from the spine to a point just within the angle of the scapula on the left side, while on the right side it does not reach more than half this distance. The outline of the dulness is well defined, giving the mapped-out area a definite quadrilateral shape. Under normal conditions this area is resonant on percussion, but the occurrence of a pericardial effusion tends to diminish the factors which normally give a resonant note over this area and to increase the factors producing dulness. Ewart mentions the following as the most likely influences: 1. A slight upward displacement of the com-

pressed base of the lung. 2. A slight downward displacement of the anterior portion of the left hepatic lobe under the weight of the pericardial effusion without any marked depression of its posterior portion. 3. A corresponding depression of the stomach, with or without slight depression to the left. This "pericardial dull patch" is essentially of hepatic origin, owing to the change produced in the position of the liver, and is not the dulness produced by the effusion itself. This dull area occurs normally in children under four years of age, and Ewart explains its occurrence to the greater size of the liver and to the shortness of the lung, allowing the former to come more directly into contact with the post-thoracic wall. He has also found it in phthisical patients where the left lung is contracted. Notwithstanding these exceptions, he finds the sign a very valuable one in the diagnosis of pericardial effusions. Although Ewart admits that cardiac hypertrophy might be expected to give the same sign, he has never succeeded in obtaining it in simple enlargement alone.

The Active Constituent of the Thyroid Gland.—Hutchison (*British Medical Journal*, March 23, 1897) gives clinical evidence favoring the view already published by him that the active constituent of the thyroid gland is contained in the colloid material. He showed in a previous communication that the proteids of the gland were two in number : 1. A nucleo-albumin present in small amount and probably derived from the cells lining the acini. 2. The colloid matter, made up of a proteid and a non-proteid part, the latter containing in all probability Baumann's thyroidin. Further, certain extractives are also obtained from the gland, as creatin, xanthin, etc. Hutchison found the extractives absolutely inert when administered either to healthy persons or to cases of myxœdema. The same result was obtained on giving the nucleo-albumin. The pure colloid matter gave the ordinary signs of thyroid activity in healthy individuals, and in large doses distinct thyroidism resulted. Marked beneficial results were obtained on administering it to a patient with myxœdema. The proteid and the non-proteid constituents of the colloid were then given separately, and although benefit resulted from the former, yet the most favorable results were obtained from the adminstration of the latter.

Ascertaining in this way that the activity of the thyroid was contained in the colloid material, Hutchison advocates strongly the administration of the pure colloid matter separated from the inert parts of the organ. The advantages of this method are obvious : 1. A constancy of dose is insured. The quantity of colloid in different glands varies considerably ; hence the amount of active substance in dried preparations of the whole gland is really not constant. 2. The drug is quite pure. 3. The pure colloid is free from taste and odor, and keeps indefinitely. 4. A very small dose is required. 5. The colloid is absorbed with great ease and rapidity. 6. The administration of the colloid matter is really the most economical way of giving the thyroid. There is no waste of active material, as occurs in the preparations of thyroidin.

A Review of 209 Gallstone-operations, including 30 Choledochotomies.—Kehr (*Archiv für klinische Chirurgie*, Band liii. Heft 2), of Halberstadt,

has obtained remarkable results in his operations for gallstones. The results attained should interest physicians, because, as Kehr remarks, the physician has not advanced the treatment of gallstones a step in five years, while during the same period operative treatment has made great strides in the hands of the surgeon. From 1890 to 1896 Kehr performed 209 laparotomies for gallstones. These were performed on 174 patients, some having been operated on more than once. Of these, 23 were males and 151 females. Of the latter, 133 were married, 117 of whom had borne children, and 18 were single. The operations are divided into five groups: 1. Those in which the gallstone was situated either in the gall-bladder or cystic duct. Under this group there were 127 operations, with only 1 death. The fatal case occurred in a man, sixty-four years of age, who had emphysema and arteriosclerosis. 2. In 21 cases a cystectomy was performed, owing to obliteration of the cystic duct or to fibrous contraction of the gall-bladder, rendering the latter functionless. The gall-bladder was accordingly excised. Only 1 case died. 3. In 30 cases the stone was situated in the common duct, and was so large that it could not be forced either into the duodenum through the papilla or through the cystic duct back into the gall-bladder. In these cases a choledochotomy was performed, the stone being removed through an incision into the common duct. Of this group only 2 cases terminated fatally. 4. Under this group were included 17 cases, in which, instead of the suspected gallstone, either some other disease-process (as ulcer of the stomach, echinococcus of the liver, or wandering kidney) was found, or the gall-bladder, being free from stones, was, however, adherent to the omentum, stomach, intestine, or abdominal wall. Two of these cases died. These cases demonstrated to Kehr, first, that in some instances an exploratory incision is necessary to make a diagnosis; and, secondly, that adhesions between the gall-bladder and adjacent structures may produce colicky pain indistinguishable from that produced by a gallstone. 5. The last group included cases in which, in association with gallstones, there existed various complications, as carcinoma of the liver, stomach, common duct, or head of the pancreas, suppurative cholangitis, syphilis of the liver, or liver-cirrhosis. This group comprised 19 cases, 10 of which terminated fatally, while 9 obtained relief from their symptoms for periods of from one and one-half to ten months.

The mortality in the 209 laparotomies was 17 cases, or 8 per cent. Where the stone was in the gall-bladder, and was removed either by cystotomy or cystectomy, the mortality was practically 0 per cent. The highest fatality occurred in those cases associated with some grave complication, as carcinoma of the liver or pancreas, etc. The most remarkable results were obtained in the operations on the common duct, where there were only 2 fatal cases in 30 operations, or 6.6 per cent. This is in marked contrast to the results heretofore obtained. Kehr collected 82 cases from the literature, in which 26 died, giving a mortality of 31 per cent.

Experiments on the Production of Pleural Effusion.—LEATHES (*Journal of Pathology and Bacteriology*, December, 1896), in an experimental work on the production of pleural effusion, studied: 1. The effect of raised capillary pressure. 2. The effect of injury to the vessel-walls. 3. The place of origin of the effused fluid. As a result of his study he formulated the following

conclusions: 1. So long as the vessels are healthy no change in the pressure of the blood in the capillaries supplying the pleura is able to bring about pleural effusion. 2. In the hydrothorax of heart-disease we have probably the concomitant working of several factors—*i. e.*, the raised capillary pressure, and in many cases a certain amount of hydræmic plethora. These, however, are acting on the capillaries which are suffering from malnutrition, and are therefore in a subinflammatory condition. There is at the same time an impediment to absorption from the obstruction to the flow through the thoracic ducts caused by the venous engorgement. 3. In the exudation of pleurisy the chief factor is an increased permeability of the walls of the vessel in the subpleural and mediastinal tissues. The increased exudation thereby produced makes its way in the direction of least resistance, viz., the pleura. The clots found in the inflammatory exudation adhere to the pleural wall and tend to check absorption, which is also probably hindered by the pressure of the peripleural exudation on the subpleural lymphatics. In every case, therefore, in which effusion into the pleura is produced, diminished absorption is associated with the increased exudation of fluid from the vessels.

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The Glandular Fever of Childhood.—DAWSON WILLIAMS (*Lancet*, January 16, 1897) reports two cases of the above-named affection. E. Pfeiffer, in 1889, described a condition observed in childhood characterized by acute enlargement of the glands, which, he contended, was an acute specific fever hitherto unrecognized, and to which he gave the name "glandular fever" (Drüsenfieber). The general symptoms described by Pfeiffer and confirmed by later observers are as follows: the patient, a child under fourteen years, becomes suddenly ill; the temperature suddenly rises to 101° to 103° F.; there are anorexia, nausea, sometimes vomiting, coated tongue, constipation, and occasionally ill-defined abdominal pain. The most prominent and characteristic symptoms, however, are stiffness of the neck, tenderness in the anterior triangle, and pain on movement of the head and on deglutition. The pharyngeal mucous membrane may be slightly reddened, but at no time during the course of the illness is there a definite tonsillitis or pharyngitis. On the second or third day a swelling is noticed in the neck, due to three or four enlarged lymphatic glands, which can be felt beneath the sterno-cleido-mastoid muscle and at the anterior border. The temperature usually becomes higher at this time, and generally reaches 104° F. The tender glands remain swollen for from two to five days, and then begin to diminish. The glands on the left side are nearly always first involved, and before they begin to subside those on the right side commence to enlarge and later reach a size equal to those first involved. Abdominal tenderness may be marked, and in the majority of the cases the mesenteric glands may be felt to be enlarged. Liver and spleen are enlarged in more than one-half the cases. The axillary and inguinal glands are swollen in some instances. The disease is usually mild, and seldom, if ever, is the direct cause of death. The glandular enlargement usually disappears within ten to fourteen days. Quite marked anæmia and weakness may persist for some time after the acute symptoms have disappeared.

The two cases reported by Williams were children in the same family and presented the characteristics above described, the glandular enlargement

commencing on the left side and later appearing on the right without any associated throat-symptoms. A third child in this family had just previously suffered a similar attack, suggesting an infectious character. Pfeiffer observed that the disease occurred in very limited epidemics, generally affecting a single family, but attacking most of the members who had not passed childhood. Those who have described the disease since Pfeiffer have laid great stress on the absence of local throat-symptoms to account for the glandular enlargement. Dr. Park West reported ninety-six cases that occurred in Eastern Ohio from 1893 to 1896. They presented the general features already related. Only one case was fatal, a delicate child convalescing from scarlet fever. Hoerschelmann thinks the incubation-period is usually from eight to ten days. West observed that most of his cases showed signs seven days after exposure. Suppuration is extremely rare, although Neumann and Comby have reported cases in which it occurred. Hesse and Starck observed severe nephritis as a complication in several members of the same family.

As to the pathology of the disease little is known, and opinions vary considerably. Comby is of the opinion that it is due to an attenuated streptococcus-infection, the surface of the tonsils constituting the point of entry. He thus favors the view that the disease is an acute specific infection, with which Ashby and Wright agree. The constant association of constipation led Starck to advance the theory that the infection might be of intestinal origin due to absorption of toxins from the retained feces. Koplik suggests that the earlier involvement of the glands on the left side might be due to the passage of the infective agent from the thoracic duct to the glands on the same side. Williams thinks that the infective agent, whatever it may be, most probably enters by the pharynx or tonsils without producing a local lesion at the point of entrance.

Protective Inoculation of Man against Typhoid Fever.—PFEIFFER and KOLLE (*Deutsche med. Wochenschrift*, No. 46, 1896), from the results of experimental work on human individuals and guinea-pigs, claim that they obtained sufficient evidence to convince them that the former can be rendered immune against typhoid fever by inoculation of minute doses of dead typhoid bacilli. It has been found that persons inoculated with increasing doses of living or dead cholera-bacilli were rendered immune against cholera, and Pfeiffer and Kolle thought that immunity against typhoid could be secured by a similar procedure. Only two persons were experimented upon, and their conclusions are drawn from the results obtained in these two cases. Neither patient had ever had typhoid fever. A suspension of a typhoid agar-culture was made in bouillon. After the typhoid bacilli had been killed by keeping the suspension in an incubator for several hours at a temperature of 56° C., 1 c.cm., or what corresponded to 2 mg. of the fresh culture-mass, was injected subcutaneously into the back of each individual. Two to three hours after inoculation signs of reaction set in, such as chilliness, dizziness, sensation of discomfort, and localized pain at the seat of inoculation. The patients were cupped before and at varying intervals after inoculation in order to obtain serum. Inoculations of typhoid bacilli and human serum obtained before inoculation were made into the peritoneal cavity of guinea-

pigs. Examinations at various intervals afterward showed that the peritoneal exudate contained numerous actively motile typhoid bacilli. On the other hand, intraperitoneal inoculations of typhoid bacilli and much smaller doses of human serum obtained after inoculation gave an exudate in which the bacilli were very few and often motionless or nearly so. Further, typhoid bacilli failed to clump or agglutinate with the serum secured before inoculation, whilst marked clumping was produced by the serum obtained after inoculation. Pfeiffer and Kolle thus found that after a single inoculation with dead typhoid bacilli an antitoxic substance is produced which has the same property of causing clumping of typhoid bacilli and rendering them immotile that the antitoxic substance in the serum of a patient with or convalescent from typhoid fever has. They hope that their discovery will be of practical importance as a prophylactic measure in severe epidemics of typhoid fever, such as, for instance, sometimes break out amongst the soldiers of a large army.

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Niemann's Tuberculosis-antitoxin.—NIEMANN (*Münch. med. Wochenschrift*, January 19, 1897) has succeeded in isolating an antitoxin from the serum of young goats that had been inoculated with increasing doses of a tuberculin prepared from a virulent culture of tubercle-bacilli. From experiments on guinea-pigs, in which tuberculosis had been produced by inoculation, he claims to have demonstrated that his goat's serum contains an antituberculin.

Animals showing tuberculous ulceration at the seat of inoculation, with tuberculous enlargement of the glands, were cured by inoculating them with the goat's serum, the ulcer healing and the glandular enlargement entirely disappearing. Niemann also obtained good results in the treatment of tuberculosis of moderate severity in human individuals. Under treatment the general condition of the patients showed marked improvement, the tubercle-bacilli disappeared from the sputum, and the cough and expectoration considerably diminished. High elevation of the temperature rarely followed the injection of the serum even in large doses, while albuminuria was never observed.

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The Early Stages of Diabetes Mellitus.—LOEB (*Centralblatt für innere Medicin*, Nov. 21, 1896), in an original article, states that it is his opinion that many persons suffering from diabetes eliminate minute quantities of sugar in their urine for long periods, often years, before the symptoms of the disease become sufficiently marked to cause the patient to consult a physician. He has a long list of cases in which patients had consulted him for some minor complaint and in whom he had found minute traces of sugar in the urine. Many of these same patients returned to him years later with large percentage of sugar in the urine and other symptoms of diabetes. One patient, a woman aged fifty-two years, sent her urine for examination and 5.3 per cent. of sugar was found. Two years previously he had examined the urine of this same patient at the time she was complaining of an intercostal neuralgia and found 0.25 per cent. sugar. Loeb at that time regarded the case as one of temporary glycosuria dependent on the intercostal neuralgia. During the two years he had examined the urine every four weeks, and for

nine months it was entirely free from sugar. The final appearance of sugar in such large percentages forced him to consider the case one of true diabetes mellitus. Two or three other cases of similar course are cited. The author, however, does not think that all these cases eventually become cases of true diabetes. One patient, for four and one-half years, had excreted sugar in her urine in quantities varying between 0.22 to 0.40 per cent. At the end of this period the urine was absolutely free from sugar and remained so, even on the ingestion of large quantities of carbohydrates. Loeb thus differs from Ebstein, who believes that all cases with sugar in the urine are cases of true diabetes, whether the sugar be extremely small in amount or even be entirely absent for a time.

Operative Treatment in Typhoid Perforation.—ARMSTRONG (*British Medical Journal*, December 5, 1896), after reviewing the literature, finds that surgeons are directly interested in about 1 per cent. of all cases of typhoid fever; that about 1.2 per cent. of typhoid cases are complicated by perforation of the intestine, and that nearly 6 per cent. of all deaths from typhoid are due to the latter cause. Perforation is commonest during the second, third, and fourth weeks, and is usually single. In discussing the subject of the mortality of typhoid fever he states that Fitz reported 17 cases of spontaneous discharge of pus in typhoid ensuing after symptoms of peritonitis. Nine of these recovered, 7 died, and in 1 the result was not stated. The pus discharged into the intestine in 13 cases, into the vagina in 1 case, through the abdominal wall in 2 cases, and at the navel in 1 case. Armstrong does not think that the diagnosis of perforation is as easy and the symptoms as distinct in many cases as text-books would lead us to suppose. Perforation having been recognized, the patient should be given opium to relieve the pain and arrest peristalsis, thus favoring the formation of adhesions and as much as possible preventing the spreading of the intestinal contents throughout the abdominal cavity. Artificial heat should be applied. With regard to the subject of laparotomy in typhoid perforation, the author thinks that if there is clinical evidence that the perforation is in the colon or that the peritonitis is likely to remain localized, one should wait for abscess-formation. On the other hand, if the evidence is in favor of perforation having taken place into the peritoneal cavity, laparotomy with closure of the perforation, thorough irrigation of the peritoneum with salt-solution, and free drainage are indicated. This should not be undertaken until the condition of collapse passes off. Including a few cases of doubtful diagnosis, laparotomy has been performed in 30 cases, with 6 recoveries. Excluding cases of doubtful diagnosis and including only early laparotomies, there have been 23 operations reported, with 4 recoveries. Armstrong and his colleagues had operated on six cases. Three of these were operated on by himself. All had terminated fatally with the exception of one of his own cases, which was still under observation, but in which there were good chances of recovery.

A Study of the Usefulness of Bianchi's Phonendoscope.—EGGER (*Münch. med. Wochenschrift*, No. 45, 1896), after a careful study of the practical usefulness of Bianchi's phonendoscope, obtained results that do not accord fully with those claimed by the inventor of that instrument. He objects to the

instrument, in the first place, on the ground that even the slightest shaking of the rubber conducting-tubes produced very distinct accessory sounds that were conducted to the ear, thus tending to obscure the heart- or lung-sounds. On the other hand, the very slightest manipulation of the metal rod that rests on the surface of the body causes a noise in the ears so intense as to be painful. Bianchi held that with the use of the phonendoscope all sounds, normal or adventitious, when they reached the ear, had the same intensity and quality which they possessed at their point of origin. Egger believes this to be untrue in many cases. In a tuberculous patient with lung-cavities an examination by direct application of the ear to the chest or by the use of the ordinary stethoscope showed pure amphoric breathing and exquisite metallic râles. On using the phonendoscope the amphoric character of the breathing and the metallic character of the râles were entirely lost, and only bronchial breathing could be made out. He convinced himself that high-pitched notes were much more poorly conducted than with the naked ear or with the ordinary stethoscope. Low-toned notes, on the other hand, were much better conducted. Bianchi claimed that the note obtained while rubbing the skin slightly during auscultation over an air-containing organ is different from that obtained over an organ not containing air. He was thus able to map out the outlines of the heart and liver. Egger is doubtful whether results thus obtained can be fully relied on, as he was able to get marked variations in the note while auscultating over various parts of the thigh. He does not believe that the phonendoscope will displace the stethoscope in clinical work.

SURGERY.

UNDER THE CHARGE OF

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Gonorrhœa in Prostitutes.—To determine the value of microscopical examination in the detection of gonorrhœa in prostitutes WOEDENSKY (*Ruskaja Medicina*, 1894, Nos. 9–11; *Fortsch. der Med.*, 1896, B. 14) examined 306 prostitutes with the following results: cervicitis was found in 58.5 per cent. of cases; of these, 41.5 per cent. had other forms of gonorrhœal infection. In 17 per cent. the uterine secretion was pure mucus; in 82.7 per cent. more or less purulent. Gonococci were found in 27.7 per cent. of the purulent secretions, and in 11.32 per cent. of the pure mucoid, or cases which would have been clinically undetected. The 41.5 per cent. of cases

which had other forms of infections, in 127 cases, 93 had urethritis, which in 39.8 per cent. contained gonococci. Guerin's paraurethral lacunæ were infected in 22 cases, but only one of these contained gonococci. In 18 cases Bartholinitis was present, 72.2 per cent. of cases showing gonococci.

Parenchymatous Injections of Carbolic Acid in Tonsillar Disease.—The frequently recurring attacks of suppurative disease of the tonsils has led KRAMER (*Cent. für Chir.*, November 21, 1896) to the conclusion that this recurrence, which is so persistent in such large numbers of cases, is really due to the presence in the tissues of the gland of bacterial spores, which are evidenced by some fresh exciting cause or condition to a new activity. His observations on a large series of cases confirmed this opinion and led him to try to destroy these spores by parenchymatous injections of carbolic acid.

For this purpose he employed, a few weeks after the recovery from an attack, the injection, by means of a sterilized hypodermatic needle, of a 2 to 3 per cent. solution of carbolic acid. The amount employed was nine minims injected two or three times a week, the treatment comprising four to six doses.

The point selected for injection was cocainized, the needle introduced, and, if no blood could be withdrawn, the injection made, pushing the needle in different directions and distributing the whole amount over a limited area.

The later injections were made each time in some new point.

The patients were all full grown. Very little pain was felt; only a slight difficulty in swallowing, which lasted for a few hours. No marked general symptoms were noted, or the slightest sign of poisoning. The local swelling in the part disappeared shortly, without the production of an abscess or other complications. Patients who had previously experienced a number of relapses previous to this method of treatment were entirely freed from further attacks, fifteen patients having had no relapses during two years and a half since treatment, while many others had had no relapses, although the treatment was of late date.

Argonin in the Treatment of Gonorrhœa. — JADASSOHN (*Archiv für Dermat. und Syph.*, Heft 1 and 2, Bd. xxxii.) comes to the following conclusions regarding the use of argonin in the treatment of gonorrhœa: 1. It is, as experimental and clinical observation have shown, on account of the absence of any coagulative action on albumin, a rapidly acting gonococcicide (usually employed in a 1.5 to 2 per cent. strength). 2. On account of its non-irritant and non-corrosive properties it commends itself in the treatment of acute gonorrhœa of the anterior and posterior urethra in the male and the urethra and uterus of the female. 3. It apparently has no astringent action, and therefore is not adapted to the treatment of simple urethritis.

Osteoplasty on the Foot.—BAYER (*Cent. für Chir.*, December 27, 1896) describes an operation which BARDENHEUER performed for the restoration of the two anterior supporting points of the foot.

In the first case there had been a destruction of the distal portion of the first metatarsal bone and the proximal portion of the first phalanx of the same toe. The operation performed was the removal of the necrosed portion of bone, the cutting of the lateral ligament of the metatarso-phalangeal

joint of the second toe, the displacement of the metatarsal bone inward, and the attachment to it of the remaining portion of the proximal phalanx of the great toe. The metatarsal bone was held in place by gauze-packing, which was gradually replaced by granulation-tissue, preventing its return to its normal position. A silver-wire suture united the fragment of the phalanx to the distal end of the metatarsal bone. The point of support in the plantar triangle, which is the distal end of the first metatarsal, was thus replaced in this case by the end of the second metatarsal. The patient made a reactionless recovery, and was enabled to walk steadily and without pain.

In the second case there was a destruction of the fifth metatarsal bone, and therefore the other anterior support of the foot was destroyed—that is, the head of this bone. The disease was of tubercular origin. The necrosed portions of bone were removed, and then the head of the fourth metatarsal bone was detached from its tarsal ligaments and displaced outwardly to replace the head of the fifth, which had been destroyed. It was retained in position by sutures and by gauze-packing and the formation of granulations in its former position.

The healing was apyretic and rapid ; the patient recovered the entire use of the foot and could walk and go upstairs without pain. The functional result obtained in these cases was of great value, restoring ease and stability in walking and doing away with cumbersome apparatus.

Safeguards in Chloroform-administration.—ARNOLD (*British Medical Journal*, December 12, 1896) calls attention to the fact that a patient may take in a sufficient quantity of chloroform-vapor in one or two deep inspirations, over which the anæsthetizer has no control, to endanger the centres of respiration. He therefore advises the use of an inhaler, which regulates the amount received by the patient. The secret of safe administration, then, lies in the following two points :

1. A very gradual increase supplied to the patient while putting him under. If this be carefully regulated, so that the quantity of vapor reaches the maximum by almost imperceptible degrees, two disagreeable and dangerous symptoms (struggling and vomiting) are almost invariably done away with. This is attained by attending to the amount of compression given to the bulb. At the start, during several respirations, only the slightest compression is used. A slightly deeper compression of the bulb is made for several ensuing respirations, and so on until a full compression is reached, which is kept up until the reflexes are abolished.

2. Once the patient is under the amount must be reduced to the minimum, or something approaching it, and by continuing to supply him constantly with this minimum dose complete anæsthesia may be maintained continuously for hours with perfect safety.

Congenital Dislocation of the Hips.—As an illustration of the diagnostic value which the x-ray possesses, the case reported by SMITH (*British Medical Journal*, December 12, 1896) is noteworthy.

The patient was first seen by him at the age of two years ; he made a diagnosis of dislocation of both hips, but was inclined to believe that

the acetabula were normal, as also the heads of the femora, and that the dislocation had taken place during delivery by the breech.

The diagnosis was not confirmed and the dislocations were not reduced. Skiagraphs by Rowland have lately shown that the acetabula were normal and that the heads of the femora were normal, so that the former diagnosis was substantiated ; and it is probable that, if the attempt had been permitted, the dislocations would have been reduced and the patient would have useful joints without deformity.

Operative Treatment of Phlegmons of the Posterior Mediastinum.— OBALIASKI (*Wiener klin. Woch.*, December 10, 1896), after reviewing the history of these operations, reports five cases of his own, making in all a total of thirteen cases which had the similarity that in all a resection of the ribs was made near their spinal articulation and the costal pleura dissected up from the heads of the ribs and the thoracic vertebræ, thus permitting an access to the vertebræ themselves or to the posterior mediastinal space. The shape of the incision the author does not believe is essential. The dissection of the costal pleura from the bone was successfully performed, with the exception of two instances in the living patient, in which the author tore the costal pleura and produced a traumatic pneumothorax ; the wound was, however, closed with sterile gauze ; during the remainder of the operation no infection ensued, and the only result was a pneumothorax, which was not purulent and passed off in one or two days after the operation.

As special indications for this operation the author gives : *a*, a cervical abscess which leads down into the posterior mediastinum or is the outgrowth of a mediastinal abscess ; *b*, an abscess originating near the spine ; *c*, a fistula in the lumbar or thoracic region ; *d*, a foreign body in the œsophagus whose exact location we know—that is, into which wall it has penetrated.

The Treatment of Syphilis by Intravenous Injections of Mercury.— LANE (*British Medical Journal*, December 12, 1896) reports the results of treatment by this method. He employed a 1 per cent. solution of the cyanide of mercury, using twenty minims or about one and one-quarter grammes, though in some of the more severe cases he commenced with double the dose for the first one or two injections. At first the injections were employed every other day, but after a short time he introduced them daily. The method of employment is the following : A loop of bandage is first tightly applied around the upper arm, and selection is made of a prominent vein in the neighborhood of the elbow-joint ; the skin is rendered aseptic and the needle thrust into the vein, the syringe, filled with solution, being attached to it ; the bandage is removed, and the syringe emptied into the vein and then rapidly removed.

The advantages of intravenous injections he summarizes as follows : they are absolutely painless, in which respect they are in direct contrast with intramuscular injections ; the functions of the digestive tract are not interfered with ; the doses of the mercurial salt are small, are certain of absorption, and can be easily regulated to the varying susceptibilities of different individuals ; with ordinary precautions the treatment is perfectly safe, and even if the vein is missed little or no inconvenience is caused thereby ; the resulting

improvement is certain and rapid, and consequently it would seem to be indicated in cases of cerebral syphilis; his experience does not warrant him in offering an opinion as to whether this treatment is followed by relapses, but so far he has not met with any. The only real objection he can see to the method is the difficulty experienced in some cases of bringing the veins into sufficient prominence, and in a certain proportion of cases, especially among women, this is an insuperable obstacle. In conclusion, he believes that in intravenous injections we have a valuable addition to our antisyphilitic therapeutic agents, though the plan is one which obviously cannot be recommended as a routine in practice.

Tuberculosis Verrucosa Cutis.—MOYNIHAN (*British Medical Journal*, November 20, 1896) describes an interesting case of this rare manifestation of tubercular disease, which is due to the local and primary inoculation of the tubercle.

The patient was a girl, aged twenty years, who had cut herself three months previous to observation on the dorsum of the right hand. The cut refused to heal and the inflammation extended; she had done washing in which there were handkerchiefs of a tuberculous patient. The wound was probably infected from this source. The ulcer was removed with a wide margin of healthy tissue, and healed permanently and rapidly.

The microscopical section showed much disturbance of the epithelium, owing to the chronic inflammatory exudation in the underlying cutis. The epidermis is thickened and varicose, and the underlying round-cell infiltration is arranged in foci resembling those of tuberculous inflammation. In some of these a giant-cell, with numerous nuclei of the tubercular type, may be seen. The lesion is doubtless of a tubercular character.

The Technique and Indications for Resection of the Rectum in Case of Cancer.—DEPAGE (*Rev. de Chir.*, November 10, 1896) gives the following as the technique he employs in cases of cancer of the rectum:

1. The patient is placed in the gynecological position, in such a manner as to give to the pelvis a vertical direction. An incision is made on the posterior aspect of the pelvis, and the coccyx and one or two sacral vertebræ are resected if it is necessary.

2. The dissection of the rectum, care being taken to leave as much of the cellular tissue and peritoneum adherent to it as possible, finally preserving the superior hemorrhoidal artery in order to maintain the nutrition of the superior portion and to remove the cancerous tissues *en masse* with the lymphatics involved by the disease.

3. Closure of the peritoneal cavity immediately after the resection of the intestine and the removal of the neoplasm.

4. Drawing down of the superior segment of the anus after having invaginated it into the inferior segment, even for cancers situated high up. There is no danger of gangrene of the intestines if care is taken to preserve the superior hemorrhoidal artery.

In one case, however, gangrene occurred, but this case supported the view already expressed, for after the removal of the necrosed tissue he found the superior segment and united it to the anus, without in this instance leading to gangrene and necrosis.

The fifth step is tamponing or suture in layers.

The author does not use the palliative iliac artificial anus except under two conditions:

1. Where operation is urgent and the general condition of the patient is bad.

2. If the cancer is so extensive that the sacrifice of the entire rectum is necessary.

The author obtained in ten cases eight recoveries. One case was seen three years and a half after operation, one a year and a half after, while two died from return of the disease one year after the operation. The others have been operated upon too lately to be of value statistically. Relapses are more rare and later in disease of the rectum than in cancer of any other portion of the body.

As indications the author says that at the beginning of the disease the radical operation is imperative; later, when the lymphatics are involved, the radical operation or an artificial anus, according to the extent of the involvement and the condition of the patient. Later, when extirpation is impossible, the artificial anus is the only and temporary relief.

Gastrectomy.—Péan (*Rev. de Chir.*, November 10, 1896) reported to the French Surgical Congress the results he has obtained in operations of this character. In 12 pylorectomies for cancer he had 4 deaths; in 3 gastro-enterostomies, 1 death. Outside of cancerous disease all his other operations were successful—4 pyloroplasties and 4 excisions of ulcers.

Within the last twenty-five years the following operations have been employed against this disease: pylorectomy, gastro-duodenostomy, the radical operations, and gastro-enterostomy, a palliative operation.

Pylorectomy is indicated in young persons who are still resistant, where the tumor is small, mobile, and has not produced lymphatic and visceral metastasis.

In every case where the first portion of the duodenum alone is involved, and it is possible to resect the diseased portion of the stomach and yet retain a small portion of the cardiac end, the surgeon may interfere; but instead of attempting to unite the duodenum to the large opening in the stomach, this should be sutured in different planes, and the duodenum united to the nearest portion of the stomach, preferably by a Murphy button.

In case of marked cachexia or lymphatic involvement one should be contented with a gastro-enterorrhaphy with a Murphy button.

A New Operation for Gastrostomy.—Fontan (*Rev. de Chir.*, November 10, 1896) gave the following as the steps in a new operation which he has employed successfully, and which has for its object the avoidance of erosion, the infiltration of surrounding tissues, etc., due to the escape of the gastric juice. This method simplifies other methods for the formation of valvular openings, and the author terms it the valvular procedure. First, the ordinary epigastric incision; second, the seizure of the stomach with a pair of toothed forceps and the production of a hernia of considerable size

third, the suturing of this fold to the edge of the wound; fourth, the invagination of the fold, the forceps still remaining in the position, and the suturing together of the serous surfaces at the ends of the wound; fifth, the incision of the stomach-wall by a bistoury passed along the forceps and the insertion of a canula.

The canula is thus placed in a valvular opening formed like an inverted bishop's mitre, with the walls of the stomach forming its gastric surface, while the serous surfaces are opposed to each other. The results obtained are perfect, no contents or gastric juice escaping through the valve thus formed.

Radical Cure of Hernia without the Use of Buried Sutures.—DUPLAY and CAZIN (*La Sem. Méd.*, November 11, 1896) having seen late abscess-formation as the result of the use of buried sutures, believe that they form a *locus minoris resistantiæ*, and that however aseptic they may be a systemic septic infection is liable to show itself at that point. They therefore advise the performance of an operation without the use of buried sutures, and accomplish this by tying the sac upon itself, after having drawn it well down, and to prevent this knot from slipping they tie a series of knots in the sac, or divide it and tie the two portions together, one knot upon another.

The parietal sutures and those employed to occlude the external ring are of silver wire, and are removed after union has taken place.

A series of twenty operations performed in this manner have yielded results as perfect as could be desired, with no recurrences and no abscess-formation.

The Treatment of Spasmodic Torticollis by Kocher's Method.—DE QUER-VAIN (*La Sem. Méd.*, October 14, 1896) strongly advocates Kocher's method, which he describes as follows: 1. The section of the sterno-cleido-mastoid. The head of the patient, while under an anæsthetic, is turned from the oper-ator and an incision is made two to three inches in length, commencing at the anterior margin of the sterno-mastoid at a point near the angle of the inferior axilla and extending upward to an inch below the mastoid, following the normal wrinkles of the neck; the author insists upon this, as it enables one to leave a scar that is scarcely noticeable. The platysma myoides is then divided, avoiding the external jugular vein and the cutaneous nerves of the region, if possible. The superficial aponeurosis of the sterno-cleido-mastoid is then incised on the anterior border of the muscle. A grooved director is then introduced and the muscle divided layer by layer.

2. The section of the cervical muscle. With the patient anæsthetized and placed on the side opposite to the one to be operated on, a transverse incision is made extending from the mastoid eminence to the median line of the neck posteriorly. After resection of the superficial aponeurosis the occipital por-tion of the trapezius is exposed, which is divided transversely; this discloses the splenius and more deeply the greater and less rhomboideus. These three muscles are divided, avoiding the great occipital nerve which passes at this point through the rhomboideus major and the trapezius. Here there is found, after the resection of these other muscles, the inferior oblique, which must likewise be divided.

The author summarizes his opinion regarding these operations as follows: the section of the affected muscles produces not only a palliation, but also a cure of torticollis, susceptible of producing favorable results in all cases that are treated individually and persistently, and is incontestably a marked step in advance in the surgical treatment of spasmodic torticollis.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

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Illumination.—DR. WALTER F. CHAPPELL (*New York Medical Journal,* 1896, No. 938) has devised a shade for the Welsbach light for use without a condenser. "It consists of a section of iron or aluminum tubing, nickel-plated on both sides, and of sufficient diameter to fit over an ordinary (one-piece) mica chimney or standard. A rim is turned up on the lower end of the shade and rests on the supports which carry the chimney. The opening in the shade corresponds in size and shape to the mantel of the Welsbach light, and admits of direct, steady light without any side-glare or reflections."

Amygdalotomy.—DR. J. HOMER COULTER, of Chicago (*New York Medical Journal*, 1896, No. 938), recommends dissecting the palatine folds half-way off from the tonsil with a small electric cautery; then drawing the tonsil forward and dissecting it out thoroughly to about one-half its extent, cutting this portion off, and treating the surface with a strong solution of silver nitrate. The other portion of the tonsil is to be removed in the same manner a week or ten days later.

Hypertrophies of the Turbinates.—DR. NORVAL H. PIERCE, of Chicago (*New York Medical Journal*, 1896, No. 938), practises submucous linear cauterization in the following manner: a small incision is made in the hypertrophied membrane through which a blunt, flat probe is introduced, and the membrane carefully separated from the erectile tissue beneath. Then a few crystals of chromic acid are fused upon the cup-shaped end of a sound and this is inserted into the track previously made by the probe, so as to cauterize the tissue.

Papillomatous Vegetations in an Infant of Two and One-half Years.—DR. DELIE reports (*Revue Hebd. de Laryngologie, d'Otologie, et de Rhinologie,* 1896, No. 42) a case in which a well-nourished and well-colored child had no other symptoms of disorder except painful and prolonged respiration, sonorous and active in both phases. The dyspnœa was worse at night and interfered with sleep.

On inspection of the mouth the entire isthmus was seen to be occupied by papillomatous vegetations from one-half millimetre to one millimetre in thickness, and from two to three millimetres in length. They were fleshy, slightly rose-tinted, glistening, and covered with epithelium, and they were firm to the touch, which did not provoke pain or bleeding. These compact villosities occupied the entire anterior face of the soft palate, and extended for a centimetre upon the mucous membrane of the hard palate. They occupied the anterior palatine folds as well as the posterior palatine folds, a portion of the tonsils, and the lateral walls of the pharynx. The rhinopharynx was free, as well as the superior face of the soft palate. Laryngoscopy revealed similar neoplasms descending laterally toward the pharynx. The epiglottis was free, but the ventricular bands were affected with the pathological process, where the vegetations were smaller, finer, and softer, less compact, less elevated, and larger than those of the throat, entirely masked the entrance into the larynx, and produced the constriction which was the cause of the respiratory stridor. No ulceration was seen anywhere. Numerous ganglions occupied the maxillary and the hyoidean regions. The infant presented no other phases of disease whatever. It had had a tenacious coryza at the age of three months, and had been querulous, pale, anæmic, and feeble up to the age of fifteen months.

Before this child had been born the mother had given birth to a stillborn infant at seven months, but she could not recall having ever been ill herself. Her eldest son, however, sixteen years of age, had some syphilitic vegetations of the anus.

The diagnosis was syphilitic vegetations. The treatment was iodized wine in progressively massive doses. Amelioration became manifest on the fifteenth day, and progressed to complete cure at the end of four months. During the regression of the vegetations it was found that the interarytenoidean fold and the laryngeal face of the arytenoids had participated in part in the syphilitic neoplasia.

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Laryngeal Tuberculosis.—At a meeting of the Laryngological Society of London, December 9, 1897 (*Journ. of Lar., Rhin., and Otol.*, February, 1897), microscopic specimens of a pedunculated tuberculous growth of the vocal cords were shown by DR. ADOLPH BRONNER.

" The larynx was in other respects apparently normal. The patient had been suffering from pulmonary phthisis for over two years, and had been hoarse for a few months. There was a small red, regular, pedunculated growth on the edge of the left vocal cord. This was removed with forceps. The patient died about a year later. There was no further history of hoarseness, and the larynx apparently remained normal up to death."

The Clinical Research Association reported as follows :

" The growth is composed of vascular connective tissue, like granulation-tissue, in which are imbedded the acini of mucous glands. There are one or two giant-cells beneath the mucous membrane, which are probably indicative of the tuberculous nature of the affection."

Dr. McBride referred to the German literature, where such growths were mentioned by Avellis and others as tuberculous tumors simulating fibromata and papillomata.

Recurrent Fatty Tumor of Epiglottis.—Dr. P. McBride reported this case to the Laryngological Society of London (*Journ. of Lar., Rhin., and Otol.*, February, 1897). It occurred in a man, forty-one years of age, who for some six months had noticed a peculiar sound in breathing. This became troublesome on lying down. There was also some difficulty in swallowing, which required a distinct effort and was accompanied by sound. A pale pink, rounded tumor, seen behind the tongue and found to be attached to the epiglottis, was removed in part with scissors and in part with incandescent snare. Eighteen months later recurrence had taken place to the full size of the growth removed. This was removed with the incandescent snare during traction with forceps, thus enucleating the mass.

Immunity for eight years followed, and then there was recurrence again, the growth becoming so large in six or eight months as to obscure the larynx.

This growth was removed with the use of the incandescent snare, aided by traction with the vulsellum. The heated wire cut through the capsule and the deeper portion came away by enucleation. Hence Dr. McBride concludes that traction should always be exercised in these fatty tumors during the time the capsule is being burned through with the incandescent snare.

Photography of the Larynx and Posterior Nares.—Dr. Thomas R. French, of Brooklyn, describes (*New York Medical Journal*, 1897, No. 947) his present method of laryngeal and post-nasal photography with the aid of the arc light, and illustrates his article with cuts of the apparatus and of various images.

While these results might fail to elicit the artistic appreciation of the novice, they are exceedingly valuable to the real student by reason of their accuracy in depicting the things as they appear from the various restricted points of observation.

Diseases of the Ethmoid.—Dr. John Noland Mackenzie, of Baltimore, presents (*New York Medical Journal*, 1897, No. 947) a contribution to the pathological anatomy of ethmoid disease, which is illustrated with a series of microscopic drawings illustrating some of the special points to which he calls attention. This article appears, likewise, in abstract in the *Journal of Laryngology* for February, 1897.

Fatal Rapid Destruction of Nose and Face.—Dr. McBride reports (*Journ. of Lar., Rhin., and Otol.*, February, 1897) this case in a house-painter, twenty-eight years of age; the lesion having begun with a scratch inside the nose. Syphilis, tuberculosis, glanders, and noma were excluded from the diagnosis, which remains undetermined.

Papilloma of the Larynx; Cancerous Degeneration; Laryngectomy; Death.—In the *Boston Medical and Surgical Journal*, 1897, No. 3, Dr. J. L. Goodale reports this case as one of cancerous degeneration of a laryngeal papilloma following operation.

To sum up: a male, aged sixty-four years, with negative clinical history, complained in March, 1894, of a hoarseness of several months' duration.

This was shown to be due to "a pea-sized, sessile, papillomatous growth, situated on the free margin of the left vocal cord at the junction of the anterior and middle thirds." The tumor was removed by Dr. J. Payson Clark and pronounced by the Massachusetts Hospital pathologist to be a benign growth, being "a small, vascular, and fibrous mass covered by flat epithelial cells."

After the operation the patient escaped observation until April 22, 1895, when he returned to the clinic and stated that his hoarseness had persisted more or less, but had not become marked until February, 1895, since which time it had increased rapidly. Examination showed the left cord and ventricular band transformed into a prominent, somewhat oval, reddened, roughly granular, rigid mass, encroaching on the lumen of the glottis and moving slightly on phonation. Right cord replaced by bright red granulations.

The larynx was excised *in toto* by Dr. Richardson. When laid open it showed no extension of the disease below the cords or above the ventricular bands. Report of the pathologist, epidermoid cancer. The patient died a week later from pneumonia.

[In view of the result of the collective investigation of Dr. Semon, of London, in which the mass of testimony negatived the opinion that these transformations occur, it is a pity that this case could not have been better studied. It is quite possible that the papilloma originally removed started upon a cancerous basis, especially as the hoarseness of which the patient complained was not relieved by the initial operation.

The compiler has seen instances in which malignant disease of a vocal band progressing inferiorly has been complicated and in part marked by papilloma upon the same side, and has thus thoroughly deceived the physicians first called to the case.]

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Extirpation of the Larynx.—At a meeting of the Laryngological Society of London, December 9, 1897 (*Journ. of Lar., Rhin., and Otol.,* February, 1897), several cases were reported.

1. An excision of the larynx and upper two rings of the trachea, for perichondral sarcoma of the cricoid cartilage, by Mr. W. G. Spencer.

2. Total extirpation of the larynx for squamous-celled epithelioma; patient and specimen shown by Mr. Lambert Lack.

3. Total extirpation of the larynx, with part of anterior wall of pharynx, of posterior of tongue, and glands in neck, for squamous-celled epithelioma, by Mr. Lambert Lack.

Mr. Lack's operations were performed without preliminary tracheotomy, and the trachea was stitched to the lower transverse incision of the skin, so as to shut off all communication with the wound before the larynx was removed. These cases have done remarkably well. One is quite well; can whisper distinctly and is able to dispense with the tracheotomy-tube. The other one is in good health and has put on a good deal of flesh. He had previously been refused operation in three hospitals.

Mr. Spencer's patient had recovered good general health, could swallow easily, and could hold conversation with the nurses and patients in the hospital. The operation had not been performed with any other view than that of palliation.

OTOLOGY.

UNDER THE CHARGE OF
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Endothelioma of the Outer Ear.—MANASSE reports a case of the above-named disease (*Archiv für Ohrenh.*, vol. xli. p. 6). The tumor in this instance had existed for ten years in the form of a teat attached to the upper part of the auricle of an old woman; latterly ulceration took place in it. It was supposed that the growth had its origin in the lymphatics.

Epithelial Cancer of the Auditory Canal.—MANASSE also reports the occurrence of epithelial cancer in the auditory canal (*Ibid.*). The tumor was removed and permanent cicatrization took place. The typical cells in this case were cylindrical and cubical, whereas usually the cells of epithelial cancer are flat.

Endothelioma of the Middle Ear.—LEUTERT observed an endothelioma of the middle ear, originating in the lower front part of the drum-cavity. This was first considered to be a polypus, but the excessive hemorrhage induced by manipulation led to the diagnosis of endothelioma. The same observer also records his finding in the pedicle of an otherwise benignant nasal polypus a nest of cancer-cells.—*Archiv f. Ohrenh.*, vol. xli. p. 64.

Sarcoma of the Middle Ear.—KUHN reports two cases of sarcoma of the middle ear (*Archiv f. Ohrenh.*, vol. xli. pp. 66–69). In the first case, a man aged thirty-three years, both ears were affected. In the course of two years, beginning with profuse suppuration and the development of malignant growths in each ear, the mouth became inflamed, the teeth dropped out, both eyes exhibited choked disks, the patient broke both legs, apparently from the acquired brittleness of the bones, and finally, with a polyuria, poly-dipsia, and phosphatic diabetes, death occurred.

In the second case, that of a woman aged forty-three years, it was stated that for two years the patient had suffered from tinnitus aurium, and in her left ear, for this same period, a bluish tumor had been noted. During a year before her examination by Kuhn an otorrhœa had existed in this ear. A small piece of the tumor in the ear was examined, and it was found to be a melanosarcoma. Operation was declined, and the woman withdrew from further observation.

JOEL (*Ibid.*) reports a primary sarcoma of the mastoid in a *child two years old.*

KÜMMEL (*loc. cit.*) claims that the diagnosis of a tumor in the region of the ear may become difficult if the growth suppurates, as the disease then resembles a simple suppuration of the middle ear or mastoid process.

BERTHOLD (*Ibid.*) claims that a choked disk is of diagnostic value only when it is permanent, in cases like that referred to by Kuhn.

KUHN (*Ibid.*) replied that in this case in both eyes there was choked disk, with very indistinct boundaries and inequalities in surface. He considered the phenomenon in this case as due to increased pressure within the brain, which was attributable, however, rather to the sarcomatous growth at the base of the skull than to the ear-tumor.

SCHUBERT (*Ibid.*) claims that simple capillary and venous congestion of the optic papilla without œdema of the retina must be carefully distinguished from a choked papilla with indistinctness of the boundaries and extensive projection into the vitreous chamber. The first form permits no sharp conclusion as to the nature of the intracranial process, and may occur with simple otitis in cases which spontaneously heal. The choked disk, however, nearly always accompanies a process encroaching upon the cavity of the cranium.

Carcinoma of the Petrous Bone.—DANZIGER (*Archiv f. Ohrenheilkunde,* vol. xli. part 1) reports two cases of the rare disease, carcinoma of the petrous bone. Both proved fatal. In the first case, an unmarried woman aged fifty-four years, the cancerous disease was preceded by forty years of purulent otorrhœa on the side finally affected with carcinoma. In the second case, a man aged fifty years, no ear-disease had ever existed. A glandular swelling behind the auricle following grippe two years previously had been treated by some kind of salve by an irregular practitioner, from the irritation of which the carcinomatous disease seemed to begin and spread inward. Facial paralysis occurred in both cases, and both cases had passed through severe influenza before the cancerous disease developed. The lesions in the brain, however, were very different. The tumor in the first case was soft and resisted by the meninges, whereas in the second case the tumor was firm and extended freely into the cranial cavity, pressing upon the brain, especially upon the superior temporal gyrus, producing aphasia.

Solitary Tubercle of the Seventh and Eighth Cranial Nerves.—MANASSE (*Archiv f. Ohrenh.,* vol. xli. p. 62) exhibited a specimen of the above-named nature, removed from a phthisical patient, aged forty-three years, who had become deaf in the left ear, while the drum-membrane remained normal. Facial paralysis with marked degenerative reaction was observed also on the left side.

The autopsy revealed in the posterior part of the left pons a firm tumor the size of a hazelnut, in the centre of which was a cavity filled with a friable, cheesy mass. Both the facial and acoustic nerves were imbedded in this mass. A second tumor, placed close to the first, reached as far as the surface of the cerebellum and projected above the pia mater the length of a bean. On the surface of this latter tumor the vagus, the glossopharyngeal, and accessorius nerves were quite firmly adherent. Some other tubercles were found in the cerebellum and in the right occipital lobe.

Fibrosarcoma of the Acoustic Nerve.—ANTON reports an occurrence of fibrosarcoma of the acoustic nerve in a man, aged fifty-five years (*Archiv f. Ohrenh.,* vol. xli. p. 61). The patient was seized with headache and blindness of the right eye, and in three hours later with blindness of the left eye. At times he vomited, and he suffered from roaring and hissing sounds in his

ears and hardness of hearing. Optic neuritis occurred on both sides and facial paralysis on the right. Death occurred eight months after the first symptoms. The autopsy revealed a tumor the size of a hen's egg, rather soft, with rough surface, situated between the pons and the cerebellum. The origin of the nerves on the left was normal; on the right side the fifth, the seventh, and the eighth nerves ran on the under surface of the tumor and then over it.

The seventh and eighth nerves were imbedded in the tumor and accompanied by the morbid tissue as far as the internal porus acusticus. The position of the right abducens and of the ninth, tenth, and eleventh cranial nerves was altered.

The same writer reports the accidental discovery of a similar kind of tumor at the autopsy of an old man. The growth was the size of a nut and rough, connected with the left acoustic nerve and extending as far as the internal porus acusticus. The acoustic and the facial nerves were separated by the tumor, but connected by a bridge of partly degenerated medullary fibres.

In both cases the fibrosarcoma originated from the sheath of the acoustic and partly from that of the facial nerve.

Thrombosis of the Lateral Sinus.—DENCH and ADAMS record successful operations for the relief of otitic thrombosis of the lateral sinus.—*Trans. Amer. Otol. Soc.*, vol. vi. part 3.

The case reported by Dench was that of a young man, aged eighteen years, who had suffered for a short time from acute otitis media. He had been seized suddenly with earache, which gradually spread backward over the mastoid. He had also suffered from vertigo and nausea. On the fifth day of the disease the auditory canal was found to contain a scanty, seropurulent discharge; there was so-called prolapse of the upper posterior part of the membrana tympani and canal-wall, indicative of defective drainage of the antrum; slight mastoid tenderness; temperature 101° F. The drum-membrane was freely incised and the ice-coil applied to mastoid; but twelve hours later the patient was seized with a chill and the temperature rose to 105.8° F. There were severe headache, delirium, and incontinence of urine and feces. The temperature fell spontaneously in a few hours to 99° F., and then in a few hours it began to rise again and became 103° F., though the patient complained only of headache.

Toxic infection of the lateral sinus was diagnosticated and the patient immediately operated upon after being suitably prepared.

The mastoid cavity was first opened with the chisel, the pneumatic spaces found filled with foul, cheesy matter, and the "free use of the curette showed that the internal table had been entirely destroyed, exposing the meninges." The lateral sinus was plainly seen in the exposed meningeal area, and was found by the exploring-needle to be empty. The sinus, on being opened, was found to contain a fibrinous clot, which was removed by the curette; no hemorrhage followed this procedure. The sinus was exposed and cleaned out to within a quarter of an inch of the bulb of the jugular. Pressure upon the jugular in the neck, coupled with passing a curette through the sinus toward the bulb of the jugular, was followed by a flow of blood. The sinus was then irrigated with normal salt-solution and the wound tamponed with iodoform-

gauze. The sinus was next followed in the opposite direction toward the torcular; the curette brought away a firm, fibrinous clot, and finally there was a free hemorrhage. The entire wound was then firmly packed with iodoform-gauze and the dressing allowed to remain in position five days. The temperature did not rise above 99°, and recovery promptly ensued.

In Adams's case (loc. cit.) the patient was a young woman, aged twenty-four years. It would seem that the bad treatment of the acutely inflamed ear by means of hot onion-poultices, etc., before Adams saw the case, led to secondary infection of the ear and phlebitis and thrombosis of the lateral sinus. The symptoms, both general and local, and the operation for exposure of the mastoid and middle-ear cavities were similar to that pursued in the case first detailed. The mastoid cavity was found to contain pus and cholesteatomatous material. This was carefully curetted away and the cavity thoroughly cleansed with a solution of bichloride (1 to 5000). The sinus was then uncovered by removal of the inner table of the mastoid with chisel and rongeur forceps. A small quantity of pus was seen to escape from the sigmoid groove. This space was washed thoroughly with a bichloride solution (1 to 5000), and then the sinus, which seemed to pulsate, was explored, but seemed to contain no blood. It was then laid open for three-quarters of an inch, and found to contain a cord-like, dry clot. This was removed from the tract toward the torcular until fluid blood appeared. The contents below were removed for a distance as far as the curette could be introduced, but no fluid blood could be obtained from this side. The sinus was irrigated with normal salt-solution and packed with iodoform-gauze. The upper part of the wound was sutured and the whole covered with antiseptic dressings. Recovery took place in three weeks.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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Arrest of Hemorrhage after Enucleation of the Eyeball.—Simeon Snell (Sheffield, Eng.) has for several years used hot water in controlling the hemorrhage following enucleation of the eyeball.

Immediately after the conclusion of the operation, and while the patient is under the influence of the anæsthetic, the parts are dried as much as possible with a pledget of cotton-wool, and then a roll of cotton-wool which has been dipped in very hot water is immediately plunged into the socket. Bleeding will often be arrested at once; but, if necessary, the proceeding may be

repeated, and then, if the bleeding has not entirely ceased, it will generally amount to no more than a little oozing. The usual pad and bandage may be applied with the eye practically dry.

Another advantage, and one perhaps not less important, is that recovery is promoted and the socket is healed some days earlier than would have been the case if the hot water had not been applied.—*Ophthalmic Review*, vol. xv. No. 180.

Congenital Ophthalmoplegia Externa.—D. GOURFEIN (Geneva) reports six cases of this condition occurring in the members of one family, a father, aged forty-two years, and five sons whose ages were from eight months to twelve years. The mother of the first patient was said to have suffered from the same condition, and a half-sister, daughter of the mother, to have had a convergent squint. The wife of this patient, mother of the boys, was free from any ocular defect, as were also two daughters. There was no trace of evidence of syphilis.

Gourfein traces a sharp distinction between this condition and the more common ophthalmoplegia externa of nuclear origin. In the latter the ptosis is always moderate, the superciliary arch normal. There is no nystagmus, but sometimes protrusion of the eyeball; vision is normal. Micropsia and false projection sometimes exist. The ocular fundus and vision are normal. On the other hand, in congenital ophthalmoplegia ptosis is very marked or complete. The superciliary arch is flattened, there is rotary nystagmus, no protrusion of the eyeball; there is more or less amblyopia, and no micropsia or false projection. In some cases there were lesions of the retina and optic nerve.

He believes that congenital ophthalmoplegia externa is not of nuclear origin, but is clearly a hereditary affection, consisting entirely in defects of the muscles.—*Rev. Med. de la Suisse Romande*, 1896, No. 12.

Removal of Orbital Tumors.—C. S. BULL (New York), in a paper on the course and prognosis of orbital tumors as influenced by surgical operations for their removal, including reports of thirty-six cases, draws the following conclusions:

1. The prognosis of all forms of malignant orbital tumors, whether primary or secondary, is unfavorable; and if the tumor be primarily one of the deep facial bones or their sinuses, the prognosis is positively bad.

2. Except in the case of encapsulated tumors of the orbit, surgical interference is almost invariably followed by a return of the tumor, and the growth of the secondary tumor is more rapid than that of the primary lesion. With each succeeding operation the period of quiescence in the return of the tumor grows shorter and the rapidity of the growth increases.

3. The patient's family, and in certain cases the patient himself, should in the beginning be told of the serious nature of the trouble and be warned that complete removal of all the disease-germs is a well-nigh hopeless task. The burden of the decision as to surgical interference must rest upon the shoulders of the patient.

4. Repeated operations in these cases undoubtedly shorten the life of the patient. While it is, therefore, our duty to operate in all cases, in order to

relieve severe or unbearable pain, we should be slow to operate merely for
the sake of relieving temporarily physical disfigurement or deformity, especi-
ally if we are convinced that by so doing we shorten the life of the patient,
even if that shortened life is rendered more bearable.—*Transactions American
Ophthalmological Society*, 1886.

Absolute Alcohol as a Disinfectant for Instruments.—R. L. RANDOLPH
(Baltimore) concludes, from an experimental bacteriological study, that in
a given number of eye-instruments by far the majority are infected by
exposure to the air; that absolute alcohol would seem a valuable disin-
fectant for instruments infected under the conditions which ordinarily sur-
round us in every-day life; but that the septic character of instruments
infected with a pure culture of staphylococcus albus is not altered by ex-
posure for twenty minutes to the action of absolute alcohol.—*Transactions
American Ophthalmological Society*, 1896.

Periodic Oculomotor Paralysis.—DR. D'ALCHÉ (Paris) has made a study
of the literature of this peculiar affection, and adopts the view of Charcot
that it is not a distinct disease, but a grouping of symptoms characterized by
hemicrania, with total paralysis of the oculomotor nerve of one side; and
that it is closely analogous to ophthalmic migraine.

It occurs usually at the age of twelve to seventeen years, and is equally
frequent in both sexes. A neuropathic heredity does not seem to play any
important part in its causation.

It is characterized by headache, which is unilateral, though not so dis-
tinctly limited as that of hemicrania. In some cases it is terribly severe,
but more frequently bearable. It is liable to exacerbations in the morning
or evening. The period of headache ends with the appearance of the oculo-
motor paralysis; sometimes quite abruptly. In other cases there is some
overlapping of periods of pain and of paralysis. The attacks occur periodi-
cally at intervals varying from a week to a year or more. The recovery is
at first complete, then partial, and finally the paralysis becomes constant.
For treatment Dr. d'Alché follows Charcot in recommending prolonged use
of bromides, with potassium iodide and electricity as adjuvants.—*Gaz. Hebd.
de Méd. et de Chirurgie*, December 10, 1896.

Treatment of Detachment of the Retina.—CASEY A. WOOD (Chicago)
thinks, with Bull, that we have as yet discovered no better device than that
resorted to with occasional success by the older ophthalmologists, viz., rest
in bed, bandages, atropine, and the internal use of some absorbent. Instead
of the long-continued use of pilocarpine, especially when that drug is ill
borne by the patient, we may substitute sodium bicarbonate and potassium
iodide, well diluted with water. In all recent cases where the eye is quiet,
and there is no vitreous strand to sever, conjunctival puncture of the sclera
may do temporary good and vision may be improved. Division of fixed
membranous bands in the vitreous may be done without causing much reac-
tion and may prevent extension of the disease.

A large percentage of the results obtained after iridectomy, after removal
of the lens, from the use of atropine, bandaging, pilocarpine, etc., even some

cases of cure following posterior operation, are really brought about by local and general rest—by putting patients in such a position that they cannot, by overexertion of any kind, make a bad matter worse. The retina, having meantime broken loose from its connection with the shrinking vitreous, returns to its normal position, and the treatment, medical or surgical, receives the credit.—*Transactions Section on Ophthalmology, American Medical Association*, 1896.

Cocaine in Glaucoma.—GROENOW (Breslau) has no fear as to harm from the employment of cocaine in eyes presenting a glaucomatous condition (*La Semaine Médicale*, 16 Ann. No. 40). He has never seen it do harm; but, on the contrary, its use has often been attended with good results. It diminishes acute pain, lessens the hyperæmia, and does not raise the tension of the eyeball. By its mydriatic effect it allows of the better examination of the eye.

OBSTETRICS.

UNDER THE CHARGE OF

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The Choice of Version or Forceps in Moderate Pelvic Deformity.—In the *British Medical Journal*, 1896, No. 1870, is published a paper by MILNE MURRAY, in which he advocates the use of forceps in cases of flattened pelvis in which the head presents transversely in the pelvic brim. Murray states that the choice of version in these cases has been based upon the belief that the forceps, applied in the antero-posterior diameter of the head, tends to compress it antero-posteriorly, and to cause a bulging of the transverse or biparietal diameter. This would increase the difficulty of extraction, as the biparietal diameter is already brought into relation with the smallest diameter of the pelvic brim. Murray doubts the truth of this belief, because he has shown by experiment that when the head is grasped over the occiput and forehead that the occipito-frontal diameter may be compressed one and one-half inches without increasing the biparietal. A vertical and not a transverse expansion results. The various segments of the cranium slide under each other in a telescopic manner.

To succeed in delivering the fœtal head presenting transversely in the brim of a flattened pelvis the forceps must not only grasp the head in its antero-posterior diameter, but must also make traction downward and backward in the axis of the pelvis. The head naturally passes through the brim, in these cases, by an exaggeration of Naegele's obliquity, by which the posterior parietal eminence pivots against the promontory of the sacrum, while

the anterior moulds itself against the pubes. Murray stated that he had delivered living children where the antero-posterior pelvic diameter was three and one-quarter inches, and even as little as two and three-quarters inches. To secure perfect axis-traction he has attached to his forceps a handle which is movable upon a right-angled traction-bar; by this means he can vary the direction of his traction to suit the abnormalities of the pelvis.

In discussion, FOTHERGILL and CAMERON agreed essentially with Murray. KERR thought that success in such extractions was obtained by rotating the head obliquely into one of the oblique diameters of the pelvic brim. He thought that it is rare to find the two halves of a pelvis of equal size, and that in difficult labor the head will enter the larger portion of the pelvis. He believed that the head rarely passed through the pelvic brim in a strictly transverse position.

(The editor, from his experience, is inclined to indorse the views of Dr. Kerr on this question. While it is no doubt possible to deliver the head in many cases as Dr. Murray indicates, still in many others the head moulds itself into an irregular, oblique position. The suggestion of Dr. Murray that the line of traction should be strongly backward as well as downward is most valuable. In a recent case, in a flat pelvis where the first child had been lost by pressure, and where others had failed with forceps, success was achieved by putting the patient in Walcher's position and by making traction in exaggerated downward and backward direction. A living child was delivered with Simpson's forceps, axis-traction being effected by the use of tapes.)

Successful Cæsarean Section upon a Rhachitic Patient, Performed at Her Home.

—In *Le Progrès Médicale*, 1896, No. 46, BÈCHET reports the case of a woman, aged thirty-eight years, having a highly contracted rhachitic pelvis, who had been in labor at intervals during three days when he was called to attend her. The head of the child was evidently large and could not descend into the pelvis. The mother was in fair condition, without infection, and her excretion fairly well performed. Symphysiotomy was declined because of the high degree of pelvic contraction, and the Cæsarean section undertaken. This was performed in the usual manner, the placenta being found beneath the line of incision and some hemorrhage occurring when the uterus was opened. This was controlled by injections of ergotin and the application of gauze-pads wrung out of hot, sterile water. The muscle of the uterus and its peritoneal covering were sutured separately and with great care, and the abdomen closed. The patient made an uninterrupted recovery. This case illustrates the fact that the Cæsarean section may be successfully performed without the advantages afforded by a hospital.

Studies in the Blood of the Newborn.

—In the *Wiener klinische Wochenschrift*, 1896, Nos. 41 and 43, are published two very interesting papers, one upon "Melæna" and the other upon the "Condition of the Red Blood-cells in Cases of Icterus Neonatorum." The first paper is by SWOBODA, one of the physicians to the Vienna Foundling Asylum. In this paper he narrates a number of cases of infants dying with passive hemorrhages from the nose,

mouth, and intestine. In a number of these post-mortem examination revealed the lesions of congenital syphilis. In others septic infection occasioned by the gonococcus was the primary cause of the bleeding. In others a meningitis had developed without lesions of syphilis. No cause other than a mechanical one from pressure upon the head, or excessive coughing or straining, could be found for the condition. He also reports several cases of bleeding from the nose in infants, in which bacteriological examination showed the presence of the bacillus of diphtheria as a cause. His interesting paper serves to illustrate the fact that melæna is a symptom only, whose cause must always be sought before the pathology or treatment of a given case becomes evident.

KNOEPFELMACHER has studied the icterus of the newborn, and the relation which the condition of the red blood-cells bears to this phenomenon. His conclusions are essentially as follows: in the first weeks of life the number of red blood-cells is not influenced by a condition of icterus. Variations in the number of red corpuscles depend upon changes in the quantity and quality of the blood-plasma. The resisting power of the red corpuscles at birth seems to be fully that possessed by these cells in the adult, and does not seem to be lessened by icterus, however intense. The microscopic examination of the blood of the newborn in these cases shows, during the first days of life, no sign of erythrocytes, but, on the contrary, gives only indications of a vigorous building-up of red blood-cells. The conclusion of these studies is in general that the condition of icterus in the newborn does not influence essentially the red blood-cells.

Purpura Hemorrhagica in a Newborn Child with Congenital Syphilis.—
In the *Revue Mensuelle des Maladies de l'Enfance*, November, 1896, JOLLY reports the case of an infant, nineteen days old, who died of purpura hemorrhagica, in whom autopsy showed intestinal ulceration and lesions characteristic of congenital syphilis. Other possible causes of these phenomena were carefully excluded in making a diagnosis.

The Use of the Phonendoscope in Obstetric Diagnosis.—In the *Prager medicinische Wochenschrift*, 1896, No. 46, KNAPP reports his observations in the use of this instrument. He agrees with PRIBRAM in the value of the instrument, and has found it especially useful in diagnosticating twin pregnancy, and also in detecting coiling of the cord about the fœtus. When a murmur can be located over the fœtus a little slower than the fœtal pulse, but more rapid than the maternal aorta, and differentiated from the placental *bruit*, a diagnosis of coiling of the cord about the fœtus may be considered as reasonably certain. In twin-pregnancy the two heart-sounds may be more readily diagnosticated by this means. The location of the placenta can also be ascertained by the use of the phonendoscope.

Symphysiotomy.—In the *Edinburgh Medical Journal*, December, 1896, DONALD reports three symphysiotomies. The first was upon a multipara who had borne five children, four of them stillborn. A general contraction of the pelvis is said to have been present, with a true conjugate of three and one-quarter inches. The patient was admitted to the hospital in the second

stage of labor, and no progress was made for three hours, although the pains were strong. The joint was opened by an incision above the pubes, the joint-surfaces separating nearly an inch. The head was adjusted to the brim and easily delivered by axis-traction forceps. The extent of separation during delivery was about two and one-half inches. The child was of average size, and a healthy female. Buried silk sutures were employed in the periosteum and the skin was closed with silkworm-gut. The pelvis was strapped, a firm bandage applied, and sandbags placed on each side of the pelvis. The patient left the hospital at the end of six weeks in good condition.

Case II. was in her second labor, the first having been terminated by the birth of a stillborn child with forceps. The pelvis was of the same type as the preceding. She was admitted to the hospital, having been in labor for twenty-four hours. The cervix was widely dilated, the head not engaged, the heart-sounds distinct. After symphysiotomy the delivery was difficult, the bones separating fully two and three-quarters inches. A living female child of average size was extracted. The patient's convalescence was somewhat hindered by swelling and suppuration of the labia. The patient was up in four weeks, and the final result was good.

Case III. was a multipara who had lost six children through embryotomy, premature labor, and tedious spontaneous labor. The true conjugate was three and one-quarter inches. Patient admitted to hospital in labor, the membranes having ruptured sixty hours before admission. As dilatation was but partly complete, de Ribes's bag was employed. The pubes separated about two inches during delivery. A puny male child was born, which required resuscitation. Patient got up in nineteen days, but was kept in hospital on account of the illness of the child. The infant developed congenital syphilis and died three months after birth.

In the *Boston Medical and Surgical Journal*, December 17, 1896, SWIFT reports the first symphysiotomy performed in Boston or vicinity. The patient was in her second labor, having been delivered of her first child by craniotomy. The patient had been in labor about twenty-four hours; the os was fully dilated and the membranes ruptured. The pelvis was symmetrically contracted, the external conjugate being seven and one-half inches. The true conjugate was estimated at about three inches. The patient was taken to a hospital and symphysiotomy performed by suprapubic incision. The patient was delivered by forceps, the pubic bones separating about one and one-half inches. The child was resuscitated without difficulty. The pelvis was brought together by firm pressure, and a heavy silk suture passed through the bones, a wire suture having broken. The pelvis was fixed by a broad band of adhesive plaster. A self-retaining catheter was placed in the bladder. The incision healed on the fifth day, and abscess formed in the line of incision. This was readily emptied, and occasioned but slight disturbance. The patient nursed her child. In the discussion which followed the report of this case the balance of opinion was in favor of Cæsarean section as being the less dangerous and more feasible operation. It was recognized that a field for symphysiotomy exists in well-chosen cases.

In the *Medical News*, January 16, 1897, the writer reported a symphysiotomy, performed in January, 1896, upon a patient whose first child had

been delivered with difficulty by forceps. This child survived. Spontaneous labor in the second instance had failed, and the physician in attendance had not succeeded in delivering with forceps. The head was but partially engaged; the heart-sounds were very rapid. The pelvis was symmetrical in contour, but contracted in all its diameters from one-half to two cm. The ground for symphysiotomy was disproportion between the pelvis and the fœtus, due not only to the pelvic contraction, but to the increase in the size which the fœtus displays in repeated pregnancy. The heart-sounds of the fœtus were very rapid, but distinct. Symphysiotomy was performed by suprapubic incision, the joint being readily opened with a bistoury. The occiput rotated posteriorly, and the child was delivered with axis-traction forceps. It was a male, weighing eight pounds, its measurements in several of the diameters of its head being from one-half to one cm. above the average. A very perceptible odor was noticed when the child was delivered; it survived eighteen hours, perishing from inspiration-pneumonia. The mother developed sapræmia, but made a good recovery. A slight discharge of sanious fluid issued from the incision for several days. She made a complete recovery and left the hospital seven weeks after admission. Subsequent measurement of her pelvis showed an increase in its diameters of one-half cm. One year after operation she was in excellent health, never having experienced the slightest inconvenience from the condition of the pelvis. Sound union in the pubes followed the operation.

GYNECOLOGY.

UNDER THE CHARGE OF

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Etiology and Treatment of Cancer of the Uterus.—BAECKER (*Archiv für Gynäkologie*, Band liii. Heft 1), from an analysis of 705 cases of cancer of the uterus, arrives at the following conclusions with reference to the etiology of the disease:

1. The true origin of malignant disease of the uterus is as yet unknown, nor can it be referred to a specific micro-organism. 2. The indirect cause is endometritis, generally of puerperal origin, which furnishes a suitable nidus for its development. This is shown by the fact that cancer is common in women who have borne children, while it is comparatively rare in single and in sterile women, as well as in those who have had gonorrhœa. Moreover, in nearly every case of cancer there is a chronic catarrh of the endometrium. Endometritis is the primary condition, malignant degeneration being secondary. Hence the practical importance of treating endometritis actively from the outset as a prophylactic measure.

In the treatment of carcinoma of the cervix total extirpation is always

preferable to high amputation, because in leaving behind the body of the uterus the surgeon leaves a chronic endometritis which furnishes a favorable nidus for the development of malignant disease, even if the latter is not already present.

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Primary Cancer of the Fallopian Tubes.—ECKARDT (*Ibid.*) reports the following case of primary alveolar cancer of the tube, the fifth on record. Twelve other reported cases were of the papillary variety.

The patient, a multipara, aged forty-five years, had complained for four weeks of pains in the back and abdomen, with loss of appetite and rapid emaciation. On entering the hospital she was very pale; the abdomen was tender on pressure, and on vaginal examination a nodular mass the size of a child's head was felt in Douglas's pouch.

On opening the abdomen the tumor was found to be universally adherent; on separating it, it tore apart and a quantity of soft, brain-like material escaped from its interior. The left adnexa were normal. Examination of the specimen showed that it consisted of the enlarged right tube, the corresponding ovary being normal, as well as the uterine end of the tube. Microscopically the structure showed the papillary-alveolar type. There was no evidence of chronic salpingitis. It is impossible, according to the writer, to diagnosticate this condition before opening the abdomen. Total extirpation of the uterus and adnexa is preferable to salpingotomy.

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Emphysema of the Skin following Cœliotomy.—HEIL (*Archiv für Gynäkologie*, Band lii. Heft 3) reports this interesting case, nine others having been recorded. On the third day after a Porro operation (the abdominal incision having been closed with deep and superficial sutures) emphysema developed along both edges of the wound. By the eighth day it had disappeared on the left side, but on the right it extended to the iliac region, when it gradually subsided, no trace of it remaining four days later.

Madlener affirms that Trendelenburg's position favors the development of emphysema, as air is drawn into the abdominal cavity by the upward movement of the intestines and diaphragm; hence he advises that the sutures should not be tied until the patient has been lowered to a horizontal posture. Gräfe advises that the abdomen should always be compressed by an assistant before sutures are tied. However, in cases reported by Leopold and Brosin the patient remained in the horizontal position throughout the operation.

The writer believes that emphysema is due entirely to imperfect approximation of the deeper layers of the abdominal wall, with firm union of the skin. This he demonstrated clearly by experiments on rabbits. To avoid emphysema, he concludes, as well as hernia, exact approximation of the recti and their sheaths is all-important, the position of the patient being a minor consideration.

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Hypertrophy of the Cervix Uteri in a Virgin.—HELME (*British Medical Journal*, December 26, 1896) describes a case of hypertrophy of the cervix in an unmarried woman, aged twenty-one years. The fundus uteri was at

nearly its normal level, while the cervix protruded from the vulva, a sound passing to the depth of four and one-half inches.

The following operation was performed: a circular incision was carried around the cervix at the level of the vesical attachment, and lateral incisions were made on either side parallel with the bases of the broad ligaments. The cervix was then freed as in the preliminary step of vaginal hysterectomy and both uterine arteries (including the cervical branches) were ligated, in order to cut off the blood-supply from the hypertrophied part. The cervix was drawn forcibly downward and transfixed antero-posteriorly with silver wire. Circular amputation was performed, followed by bilateral section of the cervix, forming anterior and posterior flaps. The vaginal and cervical mucous membranes were united, and lastly the cervix was sutured to the edge of the vaginal wound on either side.

The stitches were removed on the ninth day and the patient was discharged at the end of the third week. When examined six weeks after the operation the canal was patent and the uterus measured two and three-quarters inches.

Bicycling for Women.—THEILHABER (*Münchener med. Wochenschrift*, 1896, No. 48) recommends cycling in cases of amenorrhœa, especially when the uterus is undeveloped. Dysmenorrhœa of nervous origin in young girls and sterile women is often relieved. In endometritis the writer has seen no result, either favorable or unfavorable, from this form of exercise; in the hemorrhagic form he advises against it on theoretical grounds. It should be forbidden in chronic as well as in acute gonorrhœa, in salpingitis, and in subacute and chronic peritonitis of whatsoever origin.

Flexions and versions do not constitute a contraindication; in fact, cycling is often recommended for patients with these conditions with the view of relieving nervous symptoms and strengthening flabby muscles rather than actually relieving the displacement. This may account for the good results claimed in some cases of partial prolapsus.

The use of the bicycle is inadmissible by patients with fibroid and ovarian tumors. The writer notes the rapid increase in size of fibroids in two women who rode contrary to his advice. Bladder-troubles are usually aggravated by cycling, though on this point there is some difference of opinion. Hemorrhoids are sometimes relieved, but are sometimes made worse, especially when improper saddles are used. Such benefit as may be experienced is usually due to the relief of constipation. Women ought not to ride during menstruation, though the writer admits that several of his patients had done so without injury. Pregnancy is a positive contraindication. Two of the patients who disobeyed his injunction aborted, but a third went on to full term, though she had a retroflexed uterus and prolapsed ovaries.

In general, he approves of cycling in moderation.

H. MACNAUGHTON JONES (*Medical Press*, November 4, 1896) calls attention to the fact that cycling may have an injurious effect on women at the time of the menopause, and should not be indulged in except on the advice of a physician, especially if the patient is anæmic and has functional cardiac trouble. He doubts the propriety of women with retrodisplacements of the uterus riding, with or without pessaries; this applies especially to anæmic young girls. Hemorrhoids are aggravated, and coccygodynia may result.

The writer recommends a pneumatic saddle, so constructed as to support the ischia, but not to press upon the external genitals or the coccyx; there should be no projection under the pubes. He approves highly of this form of exercise, which he regards as far superior to massage.

PÆDIATRICS.

UNDER THE CHARGE OF
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ASSISTED BY

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A Simple Means of Throat-examination.—MILLIGAN (*Medical Record*, November 21, 1896, p. 765) suggests as an improvement upon the usual spoon-handle or depressor for examining a child's throat, the use of the child's own index-finger. Almost any child over three years of age can be quickly taught to slip his own finger along the tongue as near the base as possible, with the injunction to open the mouth wide and press down the tongue. The advantages of this method are that the child does not fear injury from his own finger; that his own effort will not provoke emesis or straining; and that there is no danger of contamination by a dirty spoon or depressor, and no possibility of autoinfection. This plan is, of course, impracticable in the moribund and in infants, but at least 95 per cent. of all cases of acute and chronic diseases of the throat or of foreign bodies can be more successfully examined by it than by any other method.

Somatose as a Galactagogue.—DREWS (*Journal de Clinique et de Thérapeutique Infantiles*, 1896) refers to the unsatisfactory character of all plans of treatment previously advocated for the purpose of preserving or increasing the supply of maternal milk. His attention was first drawn to somatose by the quite unexpected effect of its use by a mother in the third month of lactation, one of whose breasts was dry and the other failing. Under the use of a teaspoonful of somatose three times a day in a cupful of warm milk the woman began to gain in weight, and the breasts filled and yielded such an abundance of milk that nursing was continued into the seventh month. Discontinuance of the somatose for a few days, in spite of maintenance of good appetite, was followed by diminution of secretion and a return of symptoms. Twenty-five cases have been treated by the author in a similar manner, almost uniformly with the same favorable results.

A Case of Pre-natal Cerebral Palsy of the Arm.—PLACZEK presented to the Medical Society of Berlin at its meeting of June 17, 1896 (*Revue mensuelle des Maladies de l'Enfance*, September, 1896) a newborn infant seen the

day after birth for a palsy of the arm. The labor had been terminated by nature without undue delay. Spontaneous movements of the forearm were wanting in pronation and flexion, only slight movements of the fingers being observed, coupled with resistance when efforts were made to open the hand. The electrical reactions were normal on the two sides; sensation was difficult to estimate in so young an infant. The lower limbs and the skeleton showed no abnormality. The idea of the cerebral origin of the palsy was corroborated by the fact that the brother of this child had an infantile cerebral palsy. Several months before delivery the mother had received a violent blow upon the abdomen, and it was supposed that the fœtal head had been injured through the abdominal wall and that the arm-centre had been affected.

Gangrene of the Penis after Ritual Circumcision.—BROTHERS (*Medical Record*, January 30, 1897) records a case under this title in which death from septicæmia followed the ritual operation at the hands of the *mohel*. The child was born under Dr. Brothers's care and was in perfect health when his visits ceased on the ninth day. Circumcision was done on the tenth day by the usual methods followed in the religious rite. Several hours after the operation severe hemorrhage occurred, which was checked after considerable labor and four hours' active work by the religious operator, who declined the services of a physician. Forty-eight hours later the author was called to find the baby feverish, refusing to nurse, and vomiting from time to time, occasionally with blood, and in distinct collapse. The bladder was found to be distended, extending half-way up to the umbilicus. The anterior portion of the penis was in a condition of dry gangrene, presenting a black, hard, cylindrical mass about three-quarters of an inch in length, the cause of which was discovered to be a narrow strip of gauze, evidently saturated with some styptic, and tightly constricting the organ. The urethral orifice could not be discovered, and the retention was not relieved until the gangrenous tissue was freely cut away. Death occurred on the thirteenth day after the operation.

Acute Gastro-intestinal Septicæmia in Childhood.—COMBY (*Médecine Moderne*, November 11, 1896, p. 689) calls attention to the existence among children, from four to eight years of age, of a form of gastro-enteritis which has exactly the course and gravity of a cholera infantum. It follows sometimes the ingestion of food bad in quality or improper for the age of the child, sometimes without known cause. It begins as a febrile indigestion, but suddenly diarrhœa begins, vomiting becomes uncontrollable, the facies of cholera appears, and the child dies in three or four days. Fever may be wanting from the beginning. The knowledge of this condition is important, for with children of this age the gravity of the condition may not be suspected at the beginning; and even the most energetic treatment with lavage of the stomach and intestines, injection of artificial serum, etc., may utterly fail.

Cases of Fatal Epistaxis.—SWOBODA (*Wiener klin. Wochenschrift*, 1896, No. 41, p. 916) records four instances of fatal epistaxis in nurslings less than a month old, which, to superficial observation, exhibited a typical picture of

melæna, with black stools, vomiting of blood, and blood in the mouth. Two of the infants had hereditary syphilis, and at the autopsy were found to have nasal diphtheria. With the third child the nasal bleeding complicated buccal hemorrhage and purpura following a purulent rhinitis consecutive to a bilateral blennorrhagic ophthalmia. At the autopsy there was found almost complete destruction of the nasal mucosa, laying bare the bone. In this case, as in the two preceding ones, the author thinks that the hemorrhagic state was due to an infection. In the last case the nasal hemorrhage could be attributed to no definite cause. The mucosa was found to be simply congested and tumefied. Beneath the dura was found a clot covering almost the entire left hemisphere. In this case the author believes that the circulatory disturbances provoked by the intracranial hemorrhage had produced congestion and rupture of vessels in the nasal fossæ. In all these cases the bleeding had not appeared externally, but had passed by way of the nasopharynx into the stomach, and had not the source of hemorrhage been discovered by careful examination the mistaken diagnosis of melæna could easily have been made.

A Method of Home-modification of Cow's Milk for Infant-feeding.— DUFOUR (*Revue Mensuelle des Maladies de l'Enfance*, September, 1896, p. 431) describes a rather simple method of humanizing cow's milk that has been adopted at a dispensary in Fécamp fancifully named *l'Œuvre de la Goutte de Lait*. The basis of the method is Marchand's analyses as given in his thesis in 1874 (*Du lait et de l'allaitement*, Paris, 1874), which differ in some important respects from the later and more generally accepted ones now employed. According to Marchand, human milk contains 3.68 fat, 7.11 lactose, and 1.70 proteids; while cow's milk gives 3.72 fat, 5.03 lactose, and 2.31 proteids. [The proteid value of cow's milk is here very low as compared with Leeds's, 3.76, and Rotch's, 4.00. The principle, however, remains the same, and the amounts can readily be calculated for a milk of richer proteid value.] A glass vessel, holding about two litres and fitted below with a simple tap guarded by a compressible rubber spigot, receives the amount of milk required for the daily ration, and is then closed by a rubber covering and set away for four hours under proper conditions of temperature varying with the season. The cover is then removed, and one-third of the lower milk is drawn off. The proteids and salts have thus been diminished one-third. [This, however, does not reduce the proteids of the cream.] The bulk of milk withdrawn is then replaced by pure water containing in solution 35 grammes of lactose per litre. This quantity of sugar represents the difference between the 50 grammes of lactose in the cow's milk and the 70 grammes in human milk, plus the third in the cow's milk withdrawn (about 15 grammes). To the lactose is also added one gramme of table-salt per litre. The mixture is then thoroughly shaken and poured into the feeding-bottles to be sterilized. The author naively adds that some children bear well the addition of several coffee-spoonfuls of fresh cream to the daily ration, and this is found to be necessary when the weight does not show a satisfactory gain. At the " Drop of Milk " this method has been somewhat modified for wholesale manipulation. The milk is diluted with one-third of water, and to each litre of the mixture are added 15 to 20 grammes of fresh

cream, 35 grammes of lactose, and 1 of chloride of sodium. [The amount of cream here added produces 4 per cent. or more of fat, which brings the mixture to a richness equalling that of the later analyses.] This preparation is used in all cases, the amount alone varying with the child's age. The practical results of this feeding are said to be eminently satisfactory.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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Embolism of the Abdominal Aorta.—CHARRIER and APERT report a remarkable case of endocarditis in a woman, aged fifty-one years, which terminated fatally after complete occlusion of the aorta and of the left Sylvian artery by emboli, detached apparently from a large cardiac thrombus (*Bulletins de la Société Anatomique de Paris*, 1896, No. 21, 766). Twenty years before she had been laid up for a month with acute articular rheumatism, which was complicated by cardiac disease, and she had been troubled off and on since that time with symptoms referable to a valvular lesion of the heart. This examination showed to be pronounced mitral stenosis. Nine days after her admission to the Hôtel-Dieu she was suddenly seized with severe pain in the left leg, which almost at once became pale and cold and showed complete loss of sensation. At the same time there was slight elevation of temperature, and the affected region of the leg assumed a violet color, and soon came to resemble a limb affected with phlebitis. Six days later the other leg became similarly affected, but returned to its normal appearance after twenty-four hours. Two weeks later cerebral embolism occurred, with resultant right hemiplegia and complete motor aphasia. Soon after the cerebral embolism a line of demarcation about the middle of the left leg separated the lower gangrenous portion. At about the same time control was lost of the bladder and rectum, and a bedsore developed a few days before the patient's death.

The autopsy revealed a very marked degree of mitral stenosis, with great dilatation of the left auricle, in which a large white thrombus was found. The left Sylvian artery was found completely occluded near its origin by an embolus showing a structure similar to that of the auricular thrombus. Acute softening of the portion of the brain supplied by the occluded artery had occurred. But the most remarkable lesion was the complete occlusion of the abdominal aorta just below the point of origin of the inferior mesenteric artery by a large embolus. Below this point thrombosis had occurred, the clot extending on the right side throughout the entire length of the external and internal iliac arteries to the point of origin of the circumflex

and epigastric arteries from the external iliac. On the left side the clot had extended even further, occluding the femoral artery as far as its bifurcation. Below these points the arteries appeared normal. Thrombosis had also taken place above the embolus in the aorta, extending up beyond the point of origin of the renal arteries, and, on the left side, into the renal artery itself; but these thrombi only partially filled the aorta and renal artery, permitting consequently a very considerable blood-supply to the kidneys and inferior mesenteric artery. Nevertheless, numerous infarctions were found in the kidneys.

The recovery noted in the right leg after the appearance of symptoms of thrombosis in its vessels is attributed to the establishment of collateral circulation through the epigastric and circumflex arteries, which, it will be remembered, escaped thrombosis on that side of the body.

Stimulated by this remarkable case, Charrier and Apert searched the literature for reports of similar embolic occlusions of the abdominal aorta, with the result that ten were found. These they have tabulated in connection with their own case.

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Thrombosis of the Vena Cava Inferior.—WALLGREN reports a case in which death was caused by extensive thrombosis of the vena cava inferior and of its tributaries. The thrombus apparently had its origin in a spot of inflammation in the wall of the vena cava near the entrance of the hepatic veins, due to an inflammatory process between the liver and the diaphragm. This resulted in the formation of a mass of cicatricial tissue which involved the wall of the vena cava by extension. The vena cava was occluded throughout its entire length below the diaphragm, the clot extending also into the renal, iliac, and femoral veins, and to a less extent into the hepatics. Microscopic examination showed organization of the upper portion of the thrombus in the vena cava and in the neighboring hepatic veins; but the lower portion of the thrombus was unorganized, indicating that this portion of it had formed only a short time before death.

Twenty-seven similar cases of thrombosis of the inferior vena cava collected from the literature of the subject are discussed by Wallgren in so far as they serve to throw light on the etiology of the condition.—*Finska Läkaresällskapets Handlingar*, 1895, xxxviii. *Cf. Centralblatt f. Pathologie*, 1896, vii. 933.

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Tuberculous Infection through Ingestion of the Bacilli.—An experimental investigation by PROF. STRAUSS of the effects upon guinea-pigs and rabbits of the ingestion of pure cultures of the tubercle-bacillus, made primarily in the hope of ascertaining further points of distinction between human and aviary tuberculosis, has incidentally yielded a number of interesting facts relative to tuberculous infection through the alimentary tract (*Archives de Médecine expérimentale et d' Anatomie Pathologique*, 1896, viii. 689). The present study is in a measure a sequel of an investigation by Strauss and Wurtz in 1888, in the course of which it was determined that chickens possess a very remarkable resistance to human tubercle-bacilli, even when ingested in very large numbers. Thus, one chicken, which had been the subject of experiment for a year and which was afterward dissected before the

Congrès pour l'Étude de la Tuberculose (1888), was calculated to have swallowed during that time not less than one hundred pounds of tuberculous sputum. And still this and all the other chickens were found to have remained unaffected by the disease. As chickens are readily susceptible to bird-tuberculosis, a distinct difference in the pathogenic quality of the two varieties of the tubercle-bacillus was demonstrated, and it was evidently to test them further in this particular that the present investigation was undertaken.

In the present instance guinea-pigs and rabbits were made use of, and large numbers of bacilli from pure cultures were directly introduced into their stomachs with the aid of a soft catheter. As has been said, both human and aviary tuberculosis were employed in the experiments, and here again striking differences were found to exist between them. In the guinea-pigs the introduction of a single large dose of human bacilli was always followed by a widespread tuberculosis. The animals lost weight steadily and died in from six to twelve weeks. The autopsies upon them showed extensive tubercular lesions of the cæcum, of the colon, and lower portion of the ileum, of the mesenteric lymph-nodes, of the spleen and liver, and often also of the lungs. The stomach and upper portion of the small intestine escaped in almost all cases.

In marked contrast to this were the results which followed the ingestion of the germs of bird-tuberculosis. Here the guinea-pigs remained apparently healthy, in some instances even gaining in weight, and the examinations made after killing them disclosed in most instances no evidence of tuberculosis. That the bacilli found their way into the tissues was shown by the fact that a few slight lesions in which bacilli were abundantly present were found in the cæcum, spleen, liver, and lungs. It is interesting to note that these bacilli, though they had produced little or no effect upon guinea-pigs, when introduced into chickens set up a most pronounced and characteristic tuberculous process.

In the rabbits the differences in the effects resulting from the ingestion of the two varieties of the bacilli were much less pronounced. In either case the ingestion of large amounts of pure cultures of the bacilli produced no visible effect upon the health of the animals, and when they were killed at the end of three or four months no other lesion was found than an eruption of tubercles about the opening of the ileum into the cæcum and in the vermiform appendix, this peculiar localization of the lesion being accounted for by the abundance of solitary lymph-nodules in the regions named.

While, therefore, there would seem to be no great difference in the susceptibility of the rabbit to the two varieties of the tubercle-bacillus under discussion, it is equally clear that this is quite otherwise in the case of the guinea-pig, which quickly succumbs to the human variety, while showing great resistance to the bird variety.

But several other facts of interest were also determined by these experiments. The distribution of the lesions in the guinea-pigs affected with human tuberculosis contrasts distinctly with that met with in cases in which the germs have found entrance to the body through the air-passages; for, while the lungs were occasionally affected in Strauss's experiments, this appeared to occur only in cases in which the infectious material had been

present in such large amount as to have either passed through the liver or to have been carried up to the thoracic viscera through the thoracic duct. Indeed, the picture presented by the lesions in Strauss's guinea-pigs bears a striking resemblance to that occasionally met with in children who have died of tuberculosis apparently of alimentary origin.

That only a comparatively small number of the bacilli ingested found their way into the tissues was shown by the fact that large numbers of them were discharged in the feces during the eight or ten days following their ingestion. After absence from the feces for about a month they could again be detected with considerable constancy after the formation of intestinal ulcerations, but while, in the first instance, they were single, as a rule, upon their reappearance they were found to be usually in clumps of considerable size.

Finally, these experiments afford further proof of the ability of the tubercle-bacilli to pass through healthy mucous membranes, more particularly along the course of the lymphatic absorbent apparatus, this last being indicated by the limitation of the intestinal lesion, in many of the cases, to the solitary lymph-nodules of the lower ileum and cæcum.

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Intrauterine Mixed Infection in Typhoid Fever.—Numerous cases are now on record of infection of the fœtus in utero from the blood of the mother suffering from typhoid fever; but in all the cases thus far reported the typhoid bacillus alone was found to have been the cause of the infection. A case recently reported by DÜRCK, in which the *staphylococcus pyogenes albus* was associated with the typhoid bacillus, is consequently of considerable interest (*Münch. med. Woch.*, 1896, No. 36). The child was a well-developed boy, who had been carried nearly to the completion of the normal period of gestation. He died almost immediately after birth, showing on examination a slight accumulation of cloudy serum in the peritoneal cavity and enlargement of the spleen. Cultures from the liver and spleen made immediately on opening the body developed the typhoid bacillus and the staphylococcus above mentioned. Sections from the spleen showed the same bacteria scattered through the pulp. The staphylococci were more numerous than the bacilli, both in the organs and in the cultures.

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THE LOCAL TREATMENT OF THE REGIONAL FORMS OF ECZEMA.

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In the present article the remarks made will be confined to the local treatment of eczema. It is presupposed that the reader is familiar with the commoner manifestations of this disease, and that, moreover, its general pathology is understood, at least so far as it possesses a bearing upon therapeutics. Eczema is a name given to a disease of the skin which has a tolerably clear boundary, notwithstanding the fact that its manifestations are varied and are capable of undergoing numerous modifications. The fact remains, however, notwithstanding this statement, that the disease is pretty sharply defined. Thus the writer, in his several works on the diseases of the skin, has been in the habit of considering the definition of eczema mainly from a clinical standpoint, its prominent objective and subjective symptoms being thus brought forward conspicuously. It may be remarked here at the outset that I do not believe it possible for a practitioner of medicine to treat the disease successfully unless he possesses some knowledge of its general and local pathology. He must understand the process as a whole and be familiar with the pathological changes that are taking place in the skin if the remedies for its cure are to be wisely and judiciously selected. To some it may seem that the treatment of the disease is at best haphazard, and that even an experienced dermatologist may err in the selection of the remedies for a given case as readily as the all-around physician. There are points, however, which appear at once to the experienced observer in the local as well as in the general pathology of the disease. A recognition of these will enable him to lay out a

course of treatment which, because of his practical experience with many other similar cases, will probably prove beneficial.

There are two distinct modes of therapeutics: one of these calls for internal remedies, together with suitable diet; the other for local agents, including baths, lotions, ointments, pastes, plasters, bandages, instruments, and other mechanical appliances. I desire to say here that both methods are of great value in the management and treatment of this disease, and that not infrequently both are required to effect a cure. I have much faith in the proper employment of internal therapeutics in suitable cases. There are many cases of relapsing and chronic eczema which it is almost impossible to cure without the aid of drugs, diet, and hygiene, and I desire to emphasize my views on this point in connection with the remarks about to be made on local treatment. All cases of eczema, however, do not require internal therapeutics; there are some in which local remedies are all-sufficient effectually to cure the disease. In the employment of the latter much depends not only on the variety and form of the disease of the skin present, but also on the remedy prescribed, its strength, and, not least in importance, its mode of application—that is, whether in the form of an ointment, a paste, a plaster, or a lotion. The mode of application of the drugs useful in eczema and in other diseases of the skin is, in general, a more important matter than the general practitioner not familiar with the skin and its diseases is perhaps aware of. Not infrequently it means either an amelioration or an aggravation of the symptoms, according as one or another mode of treatment is made use of. Thus, pastes are often useful in cases in which ointments with friction are not tolerated, and every physician of experience is well aware that lotions may often be used with good results in cases in which ointments or pastes are not well borne.

In the present article it is my purpose to direct attention to the local treatment of eczema only, and I shall confine my remarks particularly to the management of the so-called regional forms of the disease, some of which require special formulæ and methods of application. It will be understood, then, that by pointing out and dwelling upon the most useful local remedies at our command for the commoner regional forms of the disease, I by no means wish to ignore or slight the great value of appropriate internal therapy in suitable cases. Local treatment in eczema, however, is of such importance that the subject is worthy of the most attentive consideration and study. In no other inflammatory disease of the skin is it so valuable and important. Inasmuch as we find in practice that cases of eczema usually present themselves with manifestations of the disease upon one or another locality, as, for example, the scalp, face, hand, or leg, as the case may be, the subject of the local treatment may be properly and satisfactorily considered from the point of view of the region invaded. It is the most practical

way to discuss the subject. It will be found that, according to the minute anatomy of the skin, most regions call for somewhat different remedies and methods of application. In a general way it may be stated that it is altogether inadequate to say, for example, that such drugs as tar, the mercurial salts, salicylic acid, carbolic acid, zinc oxide, and the like, are useful in eczema, without further stating the regions involved, the existing variety of the disease, and the stages of the pathological process present, especially whether acute, subacute, or chronic. All these have a most important bearing on the selection of local remedies, their method of employment, and their dosage.

The fact need not be dwelt upon that eczema may manifest itself upon any part of the general surface of the body, no region being exempt, and that the mucous membrane as well as the skin may be invaded. The mucous membrane, however, suffers by comparison infrequently, the process disposing markedly to attack the skin only. While eczema may invade large and extensive areas of the skin or even the entire general cutaneous surface, as happens occasionally, the tendency is for it to appear in small rather than large areas, as, for example, upon the arms, legs, hands, flexures, or scalp. The patches of the disease, usually irregular in shape, are often small, especially in the beginning; but the tendency is to spread on the periphery or in the form of outlying foci, which are peculiar in showing a marked disposition to coalesce, and it is in this way that large patches are generally formed.

It is well known that eczema tends to manifest itself in certain particular regions, and that it occurs here in more or less constant clinical varieties; thus, in adults the face is a favorite locality for the erythematous variety, the hands for the erythemato-squamous and fissured variety, the leg for the chronic, infiltrated, moist, and crusted variety (eczema madidans), and so on.

With these few general observations on the disease and its regional forms, the subject of the treatment may be entered upon. In order to discuss the matter to advantage I shall consider each of the more important regional forms of the disease systematically. At this point I would ask the reader to remember that whatever the region involved may be the disease is always the same, modified more or less by the anatomy of the skin, the age, and the general condition of the subject, and by local causes of one kind or another, as microbic infections, scratching, and irritants. The latter factors play a very important part in the evolution of the disease, much more so than was supposed a decade ago. Even today, knowing, as we do, so much more about bacteriology than we did a few years ago, they are hardly appreciated, if we may judge by the teachings of some of the more recent works on diseases of the skin.

Eczema of the Scalp. When the disease attacks this region in

adults it is frequently erythemato-squamous or distinctly squamous in variety. In infants and children, however, it is more apt to be pustular and crusted. It tends in either event to assume a chronic course, hence stimulating remedies are usually demanded. It is liable, especially in adults, to be confounded with psoriasis and seborrhœa, and in children with tinea tonsurans. In the latter case the microscope alone may be able to determine the question, for the hairs are by no means always loose and to be readily extracted in tinea tonsurans. This is true particularly of the disseminate, chronic form of ringworm of the scalp. If the variety of eczema present be vesico-pustular or pustular, as so often is the case in infants and children, the crusts are to be at once removed by a bland oil, followed by soap and water, applied repeatedly until the part is free from crusts. In these cases a weak carbolic-acid lotion, together with a saturated solution of boric acid and ten minims of glycerin to the ounce, followed by an ointment of salicylic acid, fifteen grains to the ounce, will often prove useful. In acute pustular eczema, especially in relapsing cases, ichthyol in olive oil, ten or twenty grains to the ounce, or the same drug with equal parts of almond oil and lime-water, is useful. Such cases usually demand mild and soothing applications. In the subacute vesicular or discharging form a salicylic-acid ointment, twenty-five to forty grains to the ounce, often has the effect of speedily checking the secretion and of curing the disease. Sometimes a weak sulphur ointment, ten to thirty grains to the ounce, especially in children where crusting exists, proves useful, and in adults in those cases in which the sebaceous glands are involved, constituting so-called seborrhœic eczema. In the mildest manifestations of the disease, especially when of the squamous variety, medicated soaps, as those containing sulphur, salicylic-sulphur, resorcin, and tar, may be of service; but for ordinary cases they are not efficacious. They lack penetrating power.

In adults the disease occurs usually in the form of one or several coin-sized, chronic, more or less infiltrated, reddish, scaly, diffuse, or circumscribed areas, the amount of scaling being sometimes slight. The itching being in most cases marked, the scales are scratched off, and the patch is thus kept comparatively free from scales or is excoriated or moist. Tar and the tarry products, in the form of lotions or ointment, are especially useful in this form of eczema, but the preparations should not be prescribed too strong. It is a common mistake to use tar too strong, thus over-stimulating the cutaneous capillaries, with the result that the skin is irritated rather than soothed. The compound tincture of mineral tar (the formula for which has been recently published in this JOURNAL and also in Part I. of the writer's work on *Cutaneous Medicine*) is an excellent preparation for the employment of tar in a liquid form. It should in almost all cases be prescribed weak rather than strong, say from three to fifteen or twenty minims to the ounce of

water, to which a few minims of glycerin may generally be added with advantage. The lotion should be sponged on or gently rubbed into the affected areas several times daily. The same preparation of coal-tar may be prescribed in the form of an ointment, with cold-cream ointment or petrolatum as a base. In some cases pix liquida, especially in ointment-form, is more useful; and here, again, I would speak of the advantage to be gained by not prescribing the tar too strong. A weak preparation is often beneficial in eczema, whereas a strong one may prove overstimulating. Fifteen minims or a half-drachm of oil of birch (oleum rusci), preferably the crude oil, or of oil of cade, to the ounce of oil of sweet almond or olive oil, may be mentioned as useful; and where a decidedly stimulating effect is desired, as in stubborn patches of long standing, a mixture of equal parts of oil of cade, soft soap, and alcohol may be rubbed in or painted on lightly twice a day. Oil of cade in alcohol or ether is sometimes preferable. Creolin is a remedy that may be used in the form of a lotion instead of the compound tincture of mineral tar, and in about the same strength. Of the mercurial salts, often so useful in eczema in general, calomel and white precipitate, in the form of ointment, twenty to eighty grains to the ounce, are to be especially recommended, and particularly in those cases in which the tarry preparations are not tolerated; and citrine ointment (always freshly prepared), rubbed down with olive oil or oil of almond to the consistence of thick cream, is in chronic cases distinctly serviceable. A tannic-acid ointment, a half-drachm or a drachm to the ounce, with carbolic acid, ten or fifteen grains, is sometimes useful in cases in which other remedies have failed; and in obstinate cases of moist eczema applications of a solution of silver nitrate from 1 to 5 per cent. strength, daily or every three days, followed by a mildly stimulating ointment, as of salicylic acid, ten or fifteen grains to the ounce, may prove beneficial.

Whatever the drug or the preparation employed may be, the case should be watched in order to note the result, especially as to the degree of stimulation produced. It is far better practice to begin with weak preparations and gradually to increase their strength, if the skin will bear them, than to order a strong preparation at first; for if the latter is not acceptable to the skin, it will probably excite and aggravate the disease, and will cause it to spread. Much mischief may thus be done in a very short period. The physician should always keep in mind when prescribing for eczema, whether of the scalp or of other regions, and whether the disease be acute or chronic, that, above all, the remedies should be so prescribed that the least amount of harm can occur. By injudicious treatment it is a very easy matter to aggravate eczema; hence due caution should always be exercised in using drugs, especially in the acute and subacute forms, in which the process is active and uncertain in its course.

Eczema of the Face. This region is frequently the seat of the disease, both in an acute and in a chronic form, due to the facts, I believe, that the skin here is highly vascular, and that the vasomotor system is in the closest touch with the locality. Reflex cutaneous diseases of all kinds, especially those connected with the alimentary tract, are particularly prone to manifest themselves on the face, as seen in acne as well as in eczema. In adults the erythemato-vesicular and erythematous varieties of eczema are those most often met with on the face. The former is often acute or subacute, whereas the latter is usually chronic and is rebellious to local remedies. Boric acid and carbolic acid in the form of a lotion, ten to fifteen grains to the ounce, with a similar amount of glycerin, with or without the addition of zinc oxide, are both particularly useful in the chronic erythematous variety observed so frequently upon the forehead in middle-aged or elderly persons. The former is the safer remedy of the two, and must be regarded as of distinct value. It acts in some cases very happily, especially where the lesion is superficial. In eczema of the forehead there is generally considerable thickening of the skin, the natural folds and lines being exaggerated. Camphor in this form of the disease sometimes acts well, as in the following ointment, which I have found a good formula, especially useful where there is hyperæsthesia as well as itching : R.—Camphor, ʒss ; emplast. plumbii, ʒiij ; petrolati, ʒiij ; ol. olivæ, ʒj. The amount of camphor may be decreased should it cause burning sensations. An ointment composed of acetanilid and cold-cream ointment, from forty to eighty grains to the ounce, often serves to allay the heat and itching, which are generally such marked symptoms. Acetanilid possesses slight anæsthetic and cooling properties when applied to the skin. I may refer to two other formulæ which are not as yet widely known, both being cooling and usually acceptable in this form of the disease. The first is composed of tragacanth, 5 parts ; glycerin, 2 parts ; boiling water, 93 parts, to which are added 2 parts of boric acid to preserve it. This formula gives a thin mucilaginous mixture or jelly, which dries rapidly on the skin, imparting to it a cooling sensation. Zinc oxide, about twenty grains to the ounce, and such drugs as carbolic acid, ichthyol, boric acid, and the like, may be added to it with advantage. It possesses the advantages of forming a thin, pliable varnish, which protects the skin and excludes the air, and, morever, of being soluble in water, and hence may be readily removed by washing. This formula was originally put forth by Prof. Pick, the addition of the boric acid (to preserve the mucilage) being the writer's slight modification. The other cooling, somewhat astringent lotion referred to is made with powdered talc and starch, of each 100 parts ; glycerin, 40 parts ; lead-water, 100 parts. This is to be diluted with from two to four parts of water. It is usually cooling in its im-

mediate effect, and is particularly useful in dry, irritable, and itching eczema. As a rule, it is not well borne where there is moisture or discharge, in these cases a zinc-oxide lotion without lead-water and one containing much less glycerin or none being preferable. The formula was first published by Prof. C. Boeck, of Christiania. Stimulating ointments are not, as a rule, tolerated in erythematous eczema, but the milder pastes may often be prescribed with benefit. The vesicular, vesico-pustular, and pustular eczemas of infants and children, so frequently met with on the face, especially on the cheeks (those areas which are such well-known centres of flushing and of congestion, due to varied causes acting reflexly), call for a somewhat different line of treatment, because they are more varied in their manifestation and more liable to rapid changes, being better and worse from day to day or week to week. In these cases the simpler drying lotions, as of zinc oxide and lime-water, two drachms to four ounces, with the addition of a little glycerin; boric-acid lotions, without or with such powders as starch, talc, zinc oxide, or bismuth subnitrate; and dusting-powders, may be advantageously made use of. The bland pastes, such as the following (known as Lassar's formula), are also of great value: R.—Zinc oxide, ℨij; pulv. amyli, ℨij; petrolatum, ℨiv. To this may be added powdered camphor, ten or twenty grains; salicylic acid, ten or fifteen grains; carbolic acid or resorcin, ten grains. All are valuable formulæ in common use. Pastes of this kind, of which the formula for the simple paste just given may be accepted as a good base, suitable for eczema generally upon any region that is not hairy, have to a large extent superseded zinc oxide and other similar ointments. They dry gradually upon the skin, but are not too drying; protect the surface from the air; allay itching and burning; prevent excoriations, and in this way, apart from any active drug they may contain, serve as valuable therapeutic agents. They are the means of bringing into close and prolonged contact with the skin many drugs, and thus prove additionally serviceable. In patchy eczemas of the arms, forearms, thighs, legs, and of the trunk, I find them particularly useful.

Eczema of the Lips. The muco-cutaneous surface about the mouth is sometimes the seat of rebellious eczema, both lips being in most cases invaded, the disease being usually confined to this locality. The symptoms are swelling, redness, heat, but not much itching, and oozing of serous or puriform fluid, with crusting. In other cases scaling, often with fissures, is a more prominent symptom. The diagnosis is usually not difficult; but syphilis, herpes simplex, and cheilitis grandularis aposthematosa must be excluded, the latter disease in particular resembling eczema closely. The involvement of the mucoid glands, with their patulous orifices, discharging a yellowish secretion which crusts readily and adheres to the lip tenaciously, will in most cases serve to render the

diagnosis tolerably easy. The treatment of chronic eczema of this region is attended with obvious difficulties. It will be found that the disease occurring here is benefited either by such soothing and bland remedies as boric-acid and glycerin lotions or by such strong agents as solutions of potassa or nitrate of silver applied occasionally. The latter are at times distinctly beneficial in chronic cases. Internal treatment and hygiene are not to be neglected.

Eczema of the Eyelids. From my clinical observation I do not hesitate to state that many cases of so-called blepharitis and of blepharo-conjunctivitis are eczematous. Such cases are often eczema, usually involving the hair-follicles, and should be treated as this disease, both locally and, also, in most cases, internally. Often, especially in adults, other signs of eczema, more or less pronounced, exist elsewhere, when the diagnosis is readily made. This form of eczema occurs most frequently in children, especially in those of a weakly or a distinctly scrofulous disposition, so that much is to be hoped for by the proper use of hygiene and diet, including good food, milk, cream, butter, eggs, cod-liver oil, and, where indicated, a change of climate. Locally, asepsis is to be insisted on, the conjunctivæ as well as the lids being treated with a weak corrosive-sublimate solution (at first 1 : 10,000 and later stronger). The skin surrounding the eyelids should at the same time be similarly treated. Here, as in eczema of the lids, potassa solution (ten grains to the ounce of water) and silver nitrate solution are useful, to be carefully applied either after extraction of the eyelashes or without resorting to this procedure. The application of potassa solutions should in all cases be performed with care after everting and drying the lid, an acid being afterward employed to neutralize the alkali. A simple, non-irritating, good ophthalmic ointment consists of lanolin, ʒiij ; oil of sweet almond and water, of each ʒss. I have found it an acceptable ointment for the eyelids, and can indorse what Jamieson, of Edinburgh, has said in its favor.

Eczema of the Beard. In males the bearded portion of the face is occasionally affected, the hair-follicles, as in eczema of the eyelids, being the main seat of the disease ; but in my experience the hair-follicles are not prone to be invaded by the eczematous process, so that I think eczema folliculare must be looked upon as a somewhat uncommon manifestation. A distinction should be made between an eczematous inflammation of the follicles and the varied forms of folliculitis in which the signs of eczema are wanting. In the diagnosis, sycosis vulgaris and tinea sycosis are, of course, also to be excluded. The local treatment is mainly that generally employed in sycosis, although the skin will be found less tolerant of stimulating remedies than in that disease.

Antiseptic lotions, pastes, ointments, and plasters are all useful, especially those containing the mercurials and sulphur. Neither should be

used strong. Ointments and pastes containing ichthyol are serviceable, and sometimes they may be used with benefit in 10 or 15 per cent. strength, though considerably weaker strengths are usually more useful. Salicylic-acid plasters, from 2 to 5 per cent. strength, often prove valuable in circumscribed areas of the disease. They should be worn by day as well as by night when practicable, shaving being performed every other day. The formula for plasters of this kind will be given later in connection with eczema of the leg, in which they prove especially valuable.

Eczema of the Ears. The auricles and the external auditory canal are both liable to be invaded by eczema, but less so than the face. On account of the peculiar anatomy of the auricle and the tumefaction which usually characterizes eczema of this region, the local treatment is beset with difficulties. Here ointments and pastes are of more service than lotions or plasters. The vesicular and pustular varieties are those which most frequently attack the auricles, but the squamous variety is also met with here, and has a special predilection for the meatus and the external auditory canal. After the acute vesicular or pustular symptoms have been subdued by zinc-oxide and boric-acid lotions or by solution of hydrogen dioxide (3 per cent.), and the crusts at the same time removed, a zinc-starch-petrolatum paste, with carbolic acid or salicylic acid (2 or 3 per cent. strength, or with tar or acetanilid, 5 or 10 per cent. strength) may be prescribed. In other cases a calomel ointment, twenty to sixty grains to the ounce, rubbed in, to which tar (half a drachm to the ounce) may often be added with advantage, is more useful than the pastes mentioned. Tar is generally well tolerated about the auricle and also in the canal, especially in ointment-form, and usually it may be prescribed stronger here than in most other regions. Where fissures exist, especially in the sulcus back of the auricle or elsewhere, touching them occasionally with a strong solution of silver nitrate may prove distinctly useful.

Eczema of the Trunk, Thighs, and Arms. These regional forms may be considered together, for the reason that the disease usually manifests itself with the same lesions upon the thighs and arms as upon the trunk. The eruption is apt to be symmetrical and diffuse, and to assume the form of erythema, papules, or vesico-papules. The diffuse or punctiform erythematous, the maculo-papular, and the papular varieties are much commoner on the trunk than on any other region. The back, the hips, and the thighs are favorite seats for papular eczema. Ill-defined lesions are more frequently met with on the trunk than elsewhere, and the diagnosis is accordingly more difficult, although the existence of multiformity is in itself a helpful feature. The erythematous and maculo-papular varieties, which are in almost all cases either acute or subacute, call for bland or sedative powders, washes, or pastes, as, for

example, a zinc-oxide and glycerin wash, with or without carbolic acid, a boric-acid lotion, or a zinc-starch-petrolatum paste. In these cases care should be taken not to employ stimulating remedies, which are tolerably sure to aggravate the condition. In the strictly papular variety, on the other hand, in which the lesions are discrete or exist in small patches, the papules being the size of pin-heads, moderately stimulating washes, as of carbolic acid and glycerin, compound tincture of coal-tar, diluted black-wash, thymol, camphor, or salicylic-acid paste, and other antipruritic remedies, in wash or in paste form, may be used. It should be borne in mind that the formulæ should be weak, and that in no instance should burning sensations be caused by the applications. A lotion composed of zinc oxide, ʒij; boric acid, ʒj; glycerin, ʒj; water, ℥vj, will generally be found serviceable in the acute, diffuse erythematous variety. To this lotion ten grains of carbolic acid or five minims of tincture of coal-tar to the ounce may be added with benefit, while in the papular variety the strength may be increased. The camphor or salicylic-acid pastes may be made in the strength of ten or fifteen grains to the ounce. A weak camphor dusting-powder, ten grains to the ounce, is sometimes beneficial in the punctiform erythematous or papular lesions met with especially on the trunk. That indicated for the trunk is equally applicable to the thighs and arms. Below the knee and elbows the lesions are generally different in form, showing less tendency to become diffuse, and stronger formulæ are indicated.

In the axilla and on the border of this region an erythemato-vesicular eruption, often circumscribed, with crusting or scaling, is not infrequently met with, and the same varieties of the disease are prone to occur beneath the mammæ in females, in the groin, and on the flexor surface of the thigh near the genital and anal regions. The disease in the latter regions may simulate tinea circinata, due to the trichophyton fungus, in which case the microscope should be employed as an aid in the diagnosis. Bland or soothing, slightly astringent dusting-powders, lotions, and pastes are useful in this form of the disease, a tannic acid or a weak sulphur paste (fifteen or twenty grains to the ounce) being serviceable. It is in these localities, as well as on the scalp, chest, and back, that seborrhœic eczema is generally met with.

Eczema of the Genitals. In the male the scrotum is the locality usually invaded, the penis frequently escaping. In the female the labia majora are commonly the seat of the disease, the neighboring skin being also frequently invaded. Eczema of the scrotum is generally particularly rebellious to treatment. In chronic cases strong remedies are demanded. The acute form needs no special remarks as to treatment, for the reason that the disease seldom begins acutely, but, as a rule, insidiously, increasing in severity and spreading gradually, especially

when the erythematous and moist varieties exist. In eczema of the genitalia, particularly the penis and vulva, glycosuria should be suspected and the urine examined. Pruritus should also be excluded. In practice I find that physicians not infrequently confound eczema with pruritus vulvæ, the error doubtless arising because the skin has not been properly examined. In one case there is no inflammation, merely the existence of subjective symptoms; in the other there are signs of eczema, often erythematous or erythemato-squamous in character. In chronic, obstinate eczema of the scrotum, attended with much thickening and corrugation of the skin, scaling, or crusting, strong applications are generally demanded. Tar, from a half to one drachm to the ounce of ointment; tar ointment, one ounce, calomel, one drachm, and carbolic acid, fifteen minims; and acetanilid, one drachm to the ounce of cold-cream ointment, are all serviceable formulæ, to be rubbed in gently but firmly three or four times daily for ten or fifteen minutes each time they are applied. The compound tincture of mineral tar, diluted (to the extent that a sensation of warmth is imparted to the skin); Vleminckx's solution (of sulphuretted lime), one part to six or three of water, or in some cases even pure, used as a lotion three or four times daily, followed by an ointment or a paste, are both valuable. In other cases painting the skin with a solution of potassa, ten or twenty grains to the ounce, once daily, employing it long enough and strong enough to cause a slightly denuded surface, or rubbing the skin freely with sapo mollis, followed in either case by a soothing litharge paste or ointment, may be found useful. The skin of the scrotum tolerates what seems like harsh treatment better than that of most other regions, so that the various stronger remedies employed in chronic eczema generally may often be used here with advantage. Tincture of soft-soap, oil of cade, and alcohol; strong carbolic acid and silver nitrate solutions; tincture of iodine; 10 per cent. solution of hydrogen dioxide, all employed occasionally, followed by the use of emollient ointments and pastes or dusting-powders, may be mentioned as being of value in rebellious cases. These remedies may also be employed in chronic eczema of the vulva, with a thickened state of the skin, but they must be used much weaker than upon the scrotum. The object in view in applying strong remedies like those just referred to is to make a positive impression upon the integument by exciting a certain degree of acute inflammation and then counteracting it with soothing and protective applications in the form of pastes or ointments. I have known equal parts of calomel and starch used as a dusting-powder to afford relief in obstinate cases of erythematous eczema of the scrotum.

Eczema of the genitals is often a distinct manifestation of a neurotic state, and hence demands a course of diet and hygiene, and suitable internal remedies; and until defective assimilation, nutrition, and in-

nervation are remedied by such means, local treatment may prove in-
effectual.

Eczema of the Anus. The diagnosis between eczema and pruritus
of this region should be clearly made out before beginning active local
treatment. As a rule, this is not difficult. Inspection of the region
should be insisted on. The presence or absence of hemorrhoids, exter-
nal or internal, and the state of the muco-cutaneous surface as to œdema,
excoriations, or fissures should at the same time be ascertained. I need
scarcely refer to the importance of noting the condition of the alimen-
tary canal and of the bowels in particular. There are cases in which
the simpler applications, as of carbolic acid and petrolatum, ten or fif-
teen grains to the ounce, or a calomel ointment, suffice to afford relief;
but most cases require other and more active remedies. I do not think,
judging from my experience, that the value of very hot-water applica-
tions to the anus, followed by cooling or antipruritic ointments or
lotions, is as well known as it ought to be. By this simple application,
used for ten or twenty minutes, relief is often obtained in cases that
have resisted a long list of more heroic remedies. In several desperate
cases I have obtained much ease from the distressing itching and burn-
ing sensations by the use of the following ointment : R.—Precipitated
sulphur, Əij ; naphthol, Əj ; morphine, gr. ij ; zinc carbonate, ʒj ; cold-
cream ointment, ʒj.

In prescribing ointments the base employed sometimes makes a dis-
tinct difference to the skin ; thus in some persons the petrolatum oint-
ments invariably prove heating or irritating, while the vegetable or
animal oils and fats are soothing. Cold-cream ointment constitutes an
excellent base for many ointments, its virtue being to some extent
due to the water it contains, which by evaporation is cooling. Lanolin
ointments and creams, for the same reason, act similarly, and hence are
often made use of in cases where a refrigerant effect is desired. In
rebellious eczema of the anus, with thickening of the skin, strong solu-
tions of tincture of coal-tar, carbolic acid, potassa, silver nitrate, tinc-
ture of iodine, and scarifications and multiple punctures, may all be
resorted to, and sometimes with great benefit. There is no doubt in
my mind that almost all cases of chronic eczema of the anus (and there
are many such in large communities of people) are curable by resorting
to the treatment, internal, general, and local, adapted to their particular
needs. I make this statement because so many persons afflicted with
this form of the disease have from time to time applied to me for advice,
firm in their belief that nothing in the way of permanent cure was to be
hoped for. I am of the opinion, moreover, that practically all cases of
localized eczema are curable. There are doubtless some exceptions, but
I do not believe that they are numerous. Because such cases (and
others as well) do not improve or recover under the use of this or that

ointment or lotion, which perhaps has been recommended to them as infallible or as having cured many similar cases, these persons gradually, through a varied experience, arrive at the conclusion that their particular case is hopeless—not, however, until they have become exhausted mentally, morally, and physically in the effort to obtain rest and freedom from their tormenting enemy.

Eczema of the Nipples. Occasionally examples of chronic eczema of the nipples in women who have not borne children are met with, the disease occurring in these cases either on one or on both nipples. In some of the most rebellious cases that I have seen one nipple only was invaded. When the disease has become well intrenched, is circumscribed about the nipple and areola, with thickening of the skin, fissures, and crusting, strong applications are required ; and it is often a matter of surprise to observe the vigorous and apparently harsh treatment tolerated by this region. Frictions with sapo mollis, painting with liquor potassæ, acetic or lactic acid, silver nitrate, tincture of iodine, all followed by emollient applications, ointments (like diachylon), pastes, or plasters, are not only generally well borne, but are of much value. The cases that I have in mind are almost always stubborn and difficult to influence by the ordinary methods of treating eczema, and for this reason the stronger remedies may as well be employed first as last, thus terminating the disease as soon as possible.

In connection with eczema occurring upon the nipple and areola, especially in the female, mention may be made of Paget's disease of the nipple, which usually has its seat here, although it may (as Crocker and others have shown) occur also in other regions, as the scrotum and face. As is now generally known, it begins as an eczematoid disease, at first in most instances indistinguishable from fissured eczema or circumscribed eczema rubrum, and running a chronic course passes into a cancerous disease of the skin, with involvement eventually, in most cases, of the mammary gland, with the usual signs of duct or glandular cancer. In the beginning the microscope as well as the clinical signs show the disease to be a malignant inflammation of the papillary layer of the skin, with destruction of its connective tissue, as was first pointed out by Thin, of London. It may be distinguished clinically from common eczema of the nipple and areola by a well-defined border, with distinct evidences of a more or less dense, cellular infiltration when the patch is taken between the fingers. The cases that I have observed have all been very rebellious to treatment, and this is also the experience of others. If the process has not advanced deeply, the best method of treatment consists of scraping the diseased skin with a dermal curette, and then applying the following plaster : R.—Pyrogallol, ʒij ; resorcin, ʒij ; salicylic acid, ʒij ; soap plaster, ʒiij ; olive oil, ʒss. This is to be spread upon muslin or kid, and the dressing reapplied twice daily. At

the end of from one to three weeks, according to its action and the character of the wound, it is to be replaced by a 2 per cent. resorcin plaster, under which, unless the ducts are invaded, it ought to heal satisfactorily. The disease when fully developed is an eczematoid epithelioma, and for the reason that it begins insidiously and is looked upon as a peculiar form of eczema of the nipple or areola, stubbornly rebellious to treatment, its true nature is not suspected until the process is deeply seated in the skin or until the ducts of the mammary gland are invaded. Such, at least, has been my experience. I believe that if the disease is properly treated by vigorous measures, such as indicated, in the early stage, it can generally be cured without resorting to a radical operation.

Eczema of the Leg. The disease occurring here manifests itself in the form of the erythematous, erythemato-squamous, vesicular, or vesico-pustular varieties, all evincing a tendency to pass into superficial or deep-seated eczema madidans or rubrum, with more or less crusting. All eczemas of the leg, however, are by no means examples of eczema rubrum. The variety of the disease which may appear in this region will depend on the age and the general condition of the subject, the degree of venous engorgement, stasis, and œdema, and the general strength or debility of the cutaneous tissues. Scratching and local infection from without always play a conspicuous part in this form of eczema. As a rule, the skin becomes diseased either in the form of one or of more coin- or palm-sized, reddened, dry and scaly, or moist or discharging areas, which run a chronic course and tend to coalesce, thus forming larger patches. The treatment naturally depends on the variety and the stage of the disease present, and also whether complications, as varix, œdema of the subcutaneous tissue, or ulcers exist. The milder forms of erythematous, slightly scaly patches call for no special remark as regards treatment, they being usually amenable to the well-known ointments and pastes in every-day use, and already referred to. In cases in which the process is acute and the surface weeping, the employment of black-wash, used as a lotion freely, followed by zinc-oxide ointment, will often afford much relief. I have made use of this simple method of treatment for a great many years, and in suitable cases it seldom fails to advance the state of the skin considerably toward recovery or cure. It is eminently adapted to acute weeping eczemas. Keeping the ointment close to the limb, and proper bandaging are, of course, important. The usual method of rubbing into the skin a stimulating ointment, as practised from time immemorial, may prove beneficial or curative, but there are many better and more expeditious modes of treatment. The employment of plasters is a comparatively recent, distinct improvement over inunction with ointments in the treatment of chronic eczema of the leg, whether the patch be dry or wet. The dressing entails comparatively little trouble, and in suitable cases insures not

only ease and comfort to the patient, but healing of the diseased areas. Plasters of this kind are made in various ways, and are composed of certain non-irritating bases to which the active expedient desired for the special case is added. Some plasters of this kind are manufactured already spread on muslin, according to a list of formulæ, and are both elegant and valuable preparations. Unna and Beiersdorf, of Hamburg, have been largely instrumental in perfecting the wholesale manufacture of these plasters as well as so-called ointment-muslins (*i.e.*, ointments spread by machinery on a suitable muslin fabric), both being useful in many forms of disease, not only in eczema, but also in numerous other instances in which oily plaster-dressings are required to be applied continuously; but, valuable as these elegant pharmaceutical preparations are, their employment must necessarily be more or less restricted to large cities, where the apothecaries' stock can be readily replenished. Other formulæ for similar plasters, which can be made at short notice by any competent apothecary, and can be spread on muslin or thin kid by the patient as needed, have been devised by Prof. Pick, of Prague, and in this country especially by Dr. Klotz, of New York, and by the writer. After a long series of experiments with different substances as plaster bases I have arrived at the conclusion that the following plaster can be recommended: R.—Liquefied soap plaster (U. S. P.), 90 parts; olive oil, 10 parts. This is a slight modification of Pick's original formulæ, over which it is an improvement as regards consistence. It is a moderately soft plaster, distinctly adhesive, and can be spread readily in ordinary living-room temperature. To this plaster base can be added salicylic acid, tar, carbolic acid, resorcin, sulphur, corrosive sublimate, chrysarobin, and many other drugs. Plasters of this kind are particularly useful in subacute and chronic, infiltrated patches of eczema, whether of the leg or of some other region. Chronic patches that have resisted other modes of treatment not infrequently yield to these plasters, which may be worn sometimes for several days without change. Of course, the stiffer the plaster the less frequently will there be necessity for changing the dressing. In regard to salicylic acid, my investigations, pharmaceutical and clinical, have proved that the greater the percentage of salicylic acid the softer the plaster becomes, so that less olive oil is required in the making of a plaster that is to contain 10 per cent. of salicylic acid than in one that is to contain 2 per cent. Allowance must therefore be made in writing the formula for the amount of salicylic acid.[1] In subacute eczemas of the leg a 2 per cent. salicylic-acid plaster is often valuable, allaying the itching, reducing the redness and thickening, and in improving generally the diseased

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[1] The writer is much indebted to Mr. J. F. Baer, apothecary, 1400 Spruce Street, Philadelphia, for his aid in arriving at the best formula for these plasters.

condition. In chronic sluggish patches a 5 or 10 per cent. plaster may prove more useful. This method of treatment possesses many advantages over inunction with ointments, which require to be applied frequently, entailing the loss of considerable time and expense. No other method of treating patches of chronic eczema rubrum of the leg is so readily applied, cheap, and generally useful as this.

For a 5 per cent. plaster the writer recommends the following proportions: R.—Soap plaster (U. S. P.), ʒj; olive oil and salicylic acid, of each 24 grains. For a 10 per cent. plaster no olive oil is required, the salicylic acid (forty-eight grains to the ounce) being sufficiently softening to make the required soap plaster a moderately firm plaster mass, that without or with the aid of a little heat can be spread on kid or muslin. When large surfaces are to be covered, heat, of course, will facilitate the spreading; but to adhere well plasters should not be too soft. In cases where a 20 per cent. plaster is required I have found the following formula the best: R.—Lead plaster (U. S. P.), ʒj; yellow wax, gr. xlviij; salicylic acid, gr. cv. It will thus be noted that the action of salicylic acid on soap plaster and on lead plaster is peculiar, tending to soften materially the plaster mass.

I have referred specially to salicylic acid as the active drug because in these cases, in one strength or another, experience has proved it to be an excellent remedy; but the other drugs named are also valuable in suitable cases in plaster form. I cannot leave this subject without referring to a certain plaster of this kind, the formula for which has been published by Dr. H. G. Klotz, of New York City.[1] The original formula of late has been somewhat improved, and Dr. Klotz now gives the following as preferable to that first published many years ago: R.—Diachylon plaster (U. S. P.), 60 parts; soap plaster (U. S. P.), 25 parts; yellow wax, 2 parts; vaseline, 8 parts; salicylic acid, 5 parts. The salicylic acid is mixed with the vaseline and added to the liquefied mixture of the plaster as soon as the mass begins to stiffen. This plaster I have found to be more friable and lumpy, and less adhesive than the formula of the writer, already given. It is, nevertheless, distinctly useful, and can be recommended.

The value of the treatment of eczema rubrum of long standing by means of sapo mollis and water applied with friction, followed by the application of freshly prepared diachylon ointment spread on strips of muslin and bound on with a bandage, must be referred to. It is an excellent method of treatment in suitable cases; but the applications, both of the soap and of the ointment, must be made neatly in order to obtain satisfactory results. The main disadvantages in employing it are the amount of time consumed twice daily in the dressing, and the

cost of the ointment, a considerable amount of ointment being requisite for each application. Many cases of eczema rubrum, especially circumscribed forms, have at different times yielded to its efficacy in my hands, and I have frequently taken occasion to speak well of the method. Thirty years ago it was much employed by the elder Hebra in Vienna, and in most cases with great success.

In chronic, much thickened or verrucous patches of eczema of the leg, solution of potassa, twenty or forty grains to the ounce, may be applied occasionally, the effect being counteracted by such emollient ointments as diachylon or a soothing diachylon soap plaster like Klotz's. Over small, circumscribed, rebellious areas, with much thickening of the skin, multiple scarification sometimes proves useful; also the application of a blister. The great value of roller bandages, properly applied, in eczema of the leg, affording not only support, but also the close application of the ointments, pastes, or plasters employed, need scarcely be referred to. The sheet-rubber bandage, while of service in some cases, must be employed with discretion; for it not infrequently aggravates the disease, not only by contact with the skin, but also by exerting undue pressure, more in one part than in another part.

There remain other methods of treatment and other local remedies to be spoken of, the first of which I shall refer to being the glycerin-gelatin preparations, of special value in dispensary practice. The several formulæ in use vary somewhat according to the amount of glycerin and gelatin they contain, the more flexible having a larger proportion of glycerin. An excellent formula for hospital and dispensary practice is the following: R.—Gelatin and zinc oxide, of each, 10 parts; glycerin and water, of each, 40 parts. This gives a product which, in the usual temperature of a living-room, is firm; but being heated in a vessel on a hot-water bath soon becomes fluid. All glycerin-gelatin preparations require heating and melting before they are applied. The application is made with a stiff bristle-brush, one layer being painted on over another. Where a firm dressing is called for, a layer of gauze or muslin is smoothly applied and glued down with another coating of glycerin-gelatin. There are certain points to be observed before making the first application and with each change of the dressing. The leg should be thoroughly cleansed with hot water and soft soap, scrubbed, and disinfected with a ½ to 1 per cent. corrosive-sublimate lotion. The slight bleeding that may take place is beneficial rather than harmful. If large ulcers are present, they may, after disinfection, be dusted lightly with iodoform, acetanilid, or some other similar powder; and if the secretion is abundant, a sterile gauze-dressing should cover it. Small ulcers need no special consideration and are to be treated the same as the eczema. In from a quarter- to a half-hour after the last coating of glycerin-gelatin has been put on the dressing is usually dry enough for the

patient to go out, and within twenty-four hours it is entirely dry and firm. It may be covered with a thin layer of absorbent cotton and a roller bandage. The formula given may be varied by the addition of more or less glycerin and zinc oxide, according as stiffness or flexibility is required. Various drugs, especially ichthyol (2 per cent.), may be incorporated in the jelly when called for; but the simple fixed dressing is valuable in itself. It possesses the following advantages: It causes no irritation, and in most cases healing of the ulcers and the cure of the eczema begin at once. It serves as a protection against scratching and infection from the outside. It can readily be washed off with water, when this is desired. The latter should not be done too often, twice a week or once every five or six days being usually sufficient, unless the secretion is profuse.

Ammoniated mercury and calomel, in the strength of from twenty to sixty grains to the ounce, are of especial service in small, subacute patches that may be benefited by inunction. For the same forms of the disease an ointment of four grains each of red precipitate and mercuric sulphide to the ounce and an ointment of mercuric sulphide, five grains, sublimed sulphur, two drachms, lard, six drachms, are useful. These ointments are also of much service in subacute and chronic eczematous patches in other regions as well, especially upon the scalp. Patches upon the arms and forearms may also be benefited by them, but pastes generally do better here, and also upon the trunk.

Inunction, even with mild ointments, oils, or fats of any kind in eczema upon the regions where the skin is tender, should always be prescribed with caution, the act of rubbing in itself generally tending to spread the disease.

Eczema of the Hands and Fingers. While eczema of the hands and fingers is common, the disease does not show the same predilection for the feet and toes, although the soles are often invaded. Upon the hands the erythematous, erythemato-squamous, fissured, vesicular, vesico-papular, vesico-pustular, and pustular varieties are all prone to occur, and hence a multiform eruption here is not uncommon. Fissures are also frequent lesions on the backs of the fingers, over the knuckles, and elsewhere, being often deep and persistent. Not infrequently the lesions on the hands and fingers are much the same in character as in scabies, and the diagnosis between these two diseases in this region may be embarrassing in the first and second weeks. The predilection of scabies for invading the hands and fingers need hardly be mentioned. It is worth remarking that in the early stages of scabies the lesions are more discrete than is usually the case in eczema. The latter disease, moreover, generally spreads more rapidly than scabies. Eczema of the hands and fingers is usually intractable in adults, and is prone to run a subacute and chronic course. In the many cases that have passed under my

observation I have repeatedly been struck with the fact that a distinctly neurotic or depressed condition of the patient existed, and I have often found it practically important to improve or cure this condition by general treatment before complete recovery will set in.   In many cases of eczema of the fingers the state of the nervous system is much the same as exists in almost all cases of cheiro-pompholyx, which disease, as is now well known, is distinctly neurotic in nature.   The milder mercurial ointments, as calomel or white precipitate, ten or twenty grains to the ounce, are often of service, and, moreover, are neat and cleanly applications.   They should be used sparingly and rubbed in gently but firmly, three times a day for from ten to twenty minutes.   To these ointments five or ten minims of the compound tincture of coal-tar to the ounce may in some cases be added with advantage.   Strong, tarry ointments, however, are seldom tolerated.   Litharge-glycerin-starch pastes (possessing a color resembling the flesh-tint), as in the following formula, are often serviceable in the subacute, papulo-vesicular variety of the fingers: R.—Litharge, 10 parts; glycerin, 30 parts; starch, 10 parts; vinegar, 60 parts; to be cooked to 80 parts.   Salicylic acid-starch-vaseline paste, 2 or 3 per cent., to which sometimes powdered camphor in like strength or stronger may be added, is also worthy of mention.

Upon small patches certain drugs, as tar and salicylic acid, may be incorporated with compound tincture of benzoin or with collodion or liquor gutta-percha, and applied as a fixed dressing.   The glycerin-tragacanth mucilage, already spoken of, is a similar and cleanly method of applying certain active remedies, as carbolic acid, and, like the glycerin-gelatin preparation, it acts as a protective.   Rubber gloves were at one time regarded with much favor for eczema of the hands and fingers; but rubber often proves irritating to the skin, and I cannot speak well of this employment, except to wear temporarily to protect the hands from such injurious influences as soap and water.

Eczema of the Palms and Soles.   The disease occurs much more frequently on the palms than on the soles.   Occurring here it in almost all instances takes on from the beginning a chronic course, and is characterized by one or more small or large, scaly patches, with thickening and fissuring of the skin.   The latter feature may be insignificant or marked, superficial fissures following the natural lines of the skin or at right-angles to them being more common than deep fissures accompanied with bleeding.   The latter occur chiefly in the hard-working classes, laborers, and drivers who are exposed to the injurious influences of cold or wet weather, chemicals, alkalies, and the like.   In chronic eczema of the palms and soles —and I may here observe that both palms or both soles are usually simultaneously invaded, and that when the palms are invaded the soles usually escape—there is apt to be considerable scaling,

with thickening of the corneous layer of the epidermis and of the corium.
The patches may be diffuse or circumscribed, but they are not often
marginate or serpiginous.   Everyone has at one time or another been
perplexed in the diagnosis between erythemato-squamous eczema and
syphilis of the palms and soles.   In some cases the lesions simulate each
other very closely, so that it is necessary to study attentively not only
the lesions themselves, but also their course and evolution.   Much is to
be learned by studying the natural course of a disease.   There is one
point that I have repeatedly noticed in this form of eczema, namely,
that the inflammatory action is usually more pronounced and more
variable in its course than in syphilis.   Notwithstanding that eczema
of this region may be eminently chronic, it will be observed in almost
all cases that the pathological process is more subject to exacerbations
and to heat and itching than occurs in syphilis.   In many cases I do
not think that the amount of keratosis present, as shown by the scaling,
is an index of much value, for both diseases show this feature often in
a marked degree.   The amount of thickening of the epidermis, verru-
cosity, and fissuring, may be as great in one disease as the other, especi-
ally upon the soles.

There is no question concerning the rebelliousness of many cases of
eczema of the palms and soles.   This is proverbial.   At the same time,
if general as well as local treatment is brought to bear upon the disease,
improvement and cure may be hoped for within a reasonable period.
Some erythemato-squamous cases of this kind are sensitive and irritable,
repelling not infrequently even the blandest oils and fats ; while in the
other instances the disease is relieved by such moderately stimulating
ointments as acetanilid, thirty or sixty grains to the ounce of cold-cream
ointment.   Tar is not well tolerated in the majority of cases, nor is car-
bolic acid, as a rule, acceptable.   When tar is prescribed it should at
first be employed cautiously.   Mild ointments of calomel, weakened
citrine ointment, or ammoniated mercury, or of ichthyol, resorcin, or
sulphur, ten or twenty grains to the ounce, are at times well borne.
When much epidermic thickening is present, as is often the case on the
soles, one of the 5 or 10 per cent. salicylic-acid plasters, referred to in
considering eczema of the legs, may be used generally with much bene-
fit, and they usually afford, moreover, ease and comfort because of their
emollient effect, the latter point being of considerable importance in
cases where the soles are concerned.   The fixed dressings, especially
plasters, in cases where they can be applied with comfort to the patient,
are not only neat and cleanly, but generally prove effective and desir-
able methods of treatment.   At times boric-acid lotions containing
glycerin are acceptable, the proportion of one part of glycerin to eight
or twelve parts of water being about right for the majority of cases.
In concluding the observations on eczema of the palms in particular I

desire to repeat that judicious internal and general treatment should always receive due consideration; for the same laws in pathology that occasion syphilis to localize itself here and prove so obstinate hold good for eczema of this region, and everyone knows the efficacy of internal medication in syphilis of the palm, and how rebellious, on the other hand, it usually is to mere local remedies.

I have thus directed attention in a very practical way to the local treatment of this important and widespread disease as it occurs on the several regions of the general surface where it is most prone to manifest itself. Mention has been made of the most valuable remedies and methods of therapy, but it has been beyond the scope of this article to refer to all of the remedies of merit and their application. No special attention has been given to the internal or general treatment of the disease, because their importance and value are so great, and the field so extensive, that this topic must be reserved for another occasion.

A STUDY OF THIRTY-ONE CASES OF CHLOROSIS,

WITH SPECIAL REFERENCE TO THE ETIOLOGY AND THE DIETETIC TREATMENT OF THE DISEASE.

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THE fact that the literature relating to the etiology of chlorosis is increasing yearly shows that none of the hypotheses thus far offered is entirely satisfactory.

Up to the year 1872 disorders of the female generative organs were regarded as giving rise to the complex of symptoms which we designate as chlorosis. This view was based essentially upon the observation that chlorosis occasionally develops in young girls in whom menstruation has previously been more or less regular, but has ceased upon the development of the disease in question. Virchow[1] was the first to show that such a hypothesis is untenable, as he found the existence of pelvic disease inconstant in the bodies of chlorotic females. His anatomical observations, on the other hand, led him to believe that an etiological connection exists between chlorosis and a congenital hypoplasia, or imperfect development of the cardio-vascular system, especially of the aorta. Similar observations were made by Rokitansky,[2]

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[1] R. Virchow: Ueber die Chlorose und die damit zusammenhängenden Anomalien des Gefässapparates, etc. Berlin, 1872.

[2] Cited by Virchow, loc. cit.

who mentions a case in which the abdominal aorta was no larger than an iliac or even a carotid artery. This hypoplasia Virchow refers to an abnormal condition of the mesenchyma, resulting in a defective development of the organs which are derived from this layer, viz., the bloodvessels, the blood, and the blood-forming organs—the bone-marrow and the spleen. There can be no doubt that such an anomalous condition must be looked upon as an important predisposing cause; but it can hardly be regarded as the cause of the disease, as the number of cases in which chlorosis is clinically observed is greater than that in which a hypoplasia of the cardio-vascular system is seen upon the post-mortem table. The fact, moreover, that the disease promptly yields to treatment in the great majority of instances is strongly against the value of Virchow's hypothesis.

Rosenbach[1] and others look upon tight corset-lacing and the resulting compression of the respiratory organs as the principal causes of chlorosis, and believe that the "excess" of hæmoglobin disappears as a consequence.

Meinert[2] likewise regards the corset as the primary cause, but ascribes the chlorosis to gastroptosis with vertical or subvertical position of the stomach, which he claims to have observed in every instance. In 15 per cent. of his cases, moreover, he was able to demonstrate the existence of a movable kidney. According to his view, the gastroptosis is an anatomical factor causing an increased irritability of the sympathetic nerve-plexuses in the abdomen, and notably the solar plexus, which governs the production of hæmoglobin in the spleen. A chlorotic attack follows whenever, owing to special psychic or physical overexertion, increased demands are made upon the nervous system. In short, according to Meinert, chlorosis is essentially a neurosis dependent upon the existence of enteroptosis.

Chlorosis not infrequently occurs in girls who have never worn a corset, so that this factor may be disregarded. The question, however, remains: Does a gastroptosis, viz., splanchnoptosis, occur in every case of chlorosis whether or not a corset has been worn? Leo[3] finds gastroptosis to be the rule in cases in which a corset has been worn, but also states that he has found the lower curvature of the stomach well above the umbilicus in a number of instances.

Pick[4] reports upon "atonic conditions of the stomach and frequent dilatation." According to him, the chlorosis is due to the absorption of poisonous products of albuminous decomposition, and the deleterious

[1] O. Rosenbach: Korsett und Bleichsucht, 1895.

[2] Meinert: Zur Aetiologie der Chlorose. Wiener med. Wochensch., 1893.

[3] H. Leo: Ueber Gastroptose und Chlorose. Deutsche med. Wochensch., 1896, p. 177.

[4] A. Pick: Zur Therapie der Chlorose. Wiener med. Wochensch., 1891, p. 939.

effects of these upon the general metabolism. He also states that the breath of chlorotic patients frequently has the odor of skatol. His treatment accordingly consists in the administration of creosote and in gastric lavage. In sixteen cases thus treated good results were noted.

It seemed of interest to the writer to determine, first, the frequency with which anæmic conditions in general are associated with splanchnoptosis and atony; and, secondly, to repeat the work of Meinert, Pick, and Leo. The results are given in Tables I., II., and III.

TABLE I.

Showing the relation existing between splanchnoptosis and anæmia, viz., chlorosis.

No.				Sex.	Age.	Gastroptosis.	Nephroptosis.	Haemoglobin.
1	.	.	.	F.	?	No.	Yes.	80 pr. ct.[1]
2	.	.	.	M.	29	Yes.	"	50 "
3	.	.	.	F.	?	No.	"	30 "
4	.	.	.	F.	19	"	"	80 "
5	.	.	.	F.	?	"	"	62 "
6	.	.	.	F.	38	"	"	50 "
7	.	.	.	F.	60	"	"	35 "
8	.	.	.	F.	?	"	"	35 "
9	.	.	.	F.	44	Yes.	"	75 "
10	.	.	.	F.	?	"	No.	75 "
11	.	.	.	F.	?	No.	Yes.	40 "
12	.	.	.	F.	?	"	"	80 "
13	.	.	.	M.	56	Yes.	"	80 "
14	.	.	.	F.	?	No.	"	65 "
15	.	.	.	F.	30	Yes.	"	50 "
16	.	.	.	F.	?	No.	"	70 "
17	.	.	.	F.	?	Yes.	"	60 "
18	.	.	.	F.	32	"	"	80 "
19	.	.	.	M.	22	No.	"	30 "
20	.	.	.	M.	40	"	"	85 "
21	.	.	.	F.	?	"	"	65 "
22	.	.	.	F.	?	"	"	60 "
23	.	.	.	F.	?	Yes.	"	70 "
24	.	.	.	M.	22	No.	"	70 "
25	.	.	.	F.	36	"	"	33 "
26	.	.	.	F.	?	"	"	65 "
27	.	.	.	F.	?	Yes.	"	60 "
28	.	.	.	F.	?	No.	"	65 "
29	.	.	.	F.	?	Yes.	"	80 "
30	.	.	.	M.	26	"	"	110 "
31	.	.	.	F.	18	"	"	50 "
32	.	.	.	F.	?	No.	"	35 "
33	.	.	.	F.	19	"	"	55 "
34	.	.	.	F.	24	Yes.	No.	35 "
35	.	.	.	F.	29	No.	Yes.	60 "
36	.	.	.	F.	28	"	"	40 "
37	.	.	.	F.	?	"	"	50 "
38	.	.	.	F.	22	Yes.	"	25 "
39	.	.	.	F.	25	No.	"	65 "

[1] These figures have reference to the scale of Fleischl's hæmometer.

TABLE II.

Showing the relation existing between simple atony of the stomach and anæmia, viz., chlorosis.

No.						Age.	Sex.	Hæmoglobin.
1	.	.	.	.	.	29	M.	50 per cent.
2	.	.	.	.	.	39	F.	75 "
3	.	.	.	.	.	58	M.	60 "
4	.	.	.	.	.	?	F.	80 "
5	.	.	.	.	.	?	F.	80 "
6	.	.	.	.	.	40	M.	85 "
7	.	.	.	.	.	21	M.	60 "
8	.	.	.	.	.	?	F.	60 "
9	.	.	.	.	.	23	M.	70 "
10	.	.	.	.	.	40	F.	70 "
11	.	.	.	.	.	22	M.	70 "
12	.	.	.	.	.	?	F.	50 "
13	.	.	.	.	.	?	F.	65 "
14	.	.	.	.	.	40	F.	50 "
15	.	.	.	.	.	?	F.	60 "
16	.	.	.	.	.	12	M.	65 "
17	.	.	.	.	.	26	M.	80 "
18	.	.	.	.	.	20	F.	70 "
19	.	.	.	.	.	29	F.	60 "
20	.	.	.	.	.	17	F.	25 "
21	.	.	.	.	.	20	F.	25 "
22	.	.	.	.	.	28	F.	40 "
23	.	.	.	.	.	25	F.	65 "
24	.	.	.	.	.	18	F.	45 "
25	.	.	.	.	.	12	F.	66 "

An examination of Table I. shows that splanchnoptosis is associated with anæmia in a fairly large percentage of cases, and this is true more particularly of nephroptosis. There remains, however, a not inconsiderable number in which amounts of hæmoglobin are found which, for city-dwellers at least, must be considered as nearly normal, and in one case, notwithstanding the existence of a most marked gastroptosis and nephroptosis, 110 per cent. of hæmoglobin was observed with Fleischl's hæmometer.

The same may be said of simple, uncomplicated atony.

An analysis of Table III. shows that splanchnoptosis is by no means invariably associated with chlorosis, although a corset was worn in almost every instance. The conclusion, hence, appears justifiable that *while splanchnoptosis is frequently observed in cases of chlorosis, it cannot be regarded as the essential causative factor.*

If, moreover, we study the cases which are associated with splanchnoptosis and atony, it will be found that while with appropriate treatment the chlorotic condition gradually disappears, the splanchnoptosis and atony still persist. Atony of the stomach, as well as splanchnoptosis, is quite common in the male, in whom chlorosis is far less fre-

quently observed than in the female, not to speak of the *married* female, in which descent of the stomach and nephroptosis are so often observed in the absence of chlorosis.

Atony of the stomach and splanchnoptosis have in themselves no part in the causation of chlorosis. In making this statement, however, the writer does not wish to convey the impression that the existence of splanchnoptosis is of no significance in such cases. There can be no doubt that the anæmic condition will be more difficult to treat, especially if a marked grade of nephroptosis is also present.

It has been pointed out that chlorosis, according to Meinert's idea, is essentially an affection of the sympathetic nervous system. This theory is also held by Jones and Murri.

Jones[1] found that in rabbits, after section of the splanchnic nerves, comparatively slight stimulation, such as the injection into the intestine of dilute saline solution, is sufficient to produce marked hyperæmia of the intestinal mucosa and hemorrhages. Having in view the well-known fact that dilatation of the bloodvessels supplying the sexual organs of the female occurs during the process of menstruation, he assumed that under certain conditions the vaso-dilatation is present in other organs supplied by the abdominal sympathetic system, leading to gastro-intestinal hyperæmia, and even to hemorrhages, which in turn give rise to chlorosis. A number of data can be brought forward in support of this view. Hässlin[2] was able to demonstrate the presence of hæmatin and iron in the feces of numerous cases of chlorosis. Kuttner[3] also has drawn attention to the fact that gastric hemorrhages are by no means uncommon in cases of chlorosis, although hæmatemesis does not necessarily occur. He states that gastric hemorrhages occurring periodically are not infrequently associated with menstruation, and that the periodical hemorrhages observed in cases of amenorrhœa stand in a generic relation to this condition. He does not regard such hemorrhages as taking the place of the physiological menstrual flow, but agrees with Jones,[4] that the stimulus caused by the hyperæmic condition of the sexual organs during the process of menstruation may, under certain conditions, extend to other portions of the sympathetic nervous system, causing hyperæmia. According to modern views, however, a hemorrhage—aside from traumatism—can only occur when the bloodvessel-walls or their surroundings, such as the gastro-intestinal mucosa, are diseased.[5] In this connection it is of interest to

[1] Ll. Jones: Preliminary Report on the Causes of Chlorosis. Brit. Med. Journ., 1893, ii. p. 670.

[2] v. Hässlin: Münch. med. Wochensch., 1890, No. 14.

[3] L. Kuttner: Ueber Magenblutengen und besonders über deren Beziehungen zur Menstruation. Berlin. klin. Wochensch., 1895, Nos. 7, 8, and 9.

[4] Jones, loc. cit.

[5] M. Bresgen: Ueber Epistaxis. Eulenburg's Real-Encyclop., 1886, vol. vi. p. 474.

note that Virchow[1] found the arteries of chlorotic females abnormally thin throughout, owing to atrophy of the muscular coat, and that the intima frequently was waxy.

Kuttner has drawn attention to the fact that the macroscopic and even the microscopic examination of the gastric contents is not always sufficient to demonstrate the presence or absence of blood, as the appearance remains unaltered if the hemorrhage has been slight. Whenever, then, the macroscopic and microscopic examination yields negative results the method recommended by Müller[2] and Weber[3] should be employed. To this end the gastric contents are treated with a few cubic centimetres of concentrated acetic acid and extracted with ether. Should the ether not separate out as a clear layer after a few minutes, a few drops of alcohol are added. If the ether then remains colorless, no blood-pigment is present, while a brownish-red color indicates the presence of acetate of hæmatin. As a similar but yellowish-brown and much less intense discoloration of the ether may be produced by other pigments, such as biliary coloring-matter, it is well in doubtful cases to test the ethereal extract with tincture of guaiacum. A positive result indicates the presence of blood-coloring matter. The same may be said if, upon spectroscopic examination of the ethereal extract, an absorption band is discovered at the junction of the red and yellow.

Most valuable is the iron-test of Korczynski and Jaworski.[4] A small amount of the sediment to be examined is treated with a pinch of potassium chlorate and a drop of concentrated hydrochloric acid, and the mixture carefully heated until it has become decolorized. If necessary, more of the hydrochloric acid is added. As soon as all the chlorine has been driven off, one or two drops of a dilute solution of potassium ferrocyanide are added, when in the presence of blood-coloring matter a distinctly blue color is obtained, owing to the formation of Prussian-blue.

The writer has been able to examine the gastric contents of only five chlorotic patients in this manner. In four a negative result was obtained; the fifth was one of ulcer complicating the chlorosis, and in this case blood-coloring matter was found.

Opposed to the correctness of Jones's hypothesis, however, is the fact that chlorosis is at times observed in young girls in whom menstruation has not as yet been established. The writer has a young chlorotic female under observation at the present time in whom chlorosis developed at

[1] Virchow, loc. cit.

[2] Seiffert und Müller: Taschenbuch der med.-klin. Diagnostik, 1893, p. 69.

[3] H. Weber: Ueber den Nachweis des Blutes in dem Magen und Darminhalte. Berlin. klin. Wochensch., 1893, No. 19.

[4] Korczynski und Jaworski: Klinische Befunde bei Ulcus und Carcinoma. Deutsche med. Wochensch., 1886, Nos. 47–49.

the age of sixteen years, while the first signs of menstruation did not appear before the twentieth year. It is difficult, moreover, to understand why the blood-condition usually improves upon the administration of iron, unless iron causes vaso-constriction, which is not borne out by experience, as hyperæmia of the gastrointestinal mucosa and even inflammation may result from its use.

An analysis of post-mortem records, as far as such have been accessible to the writer, shows, furthermore, that ecchymoses of the gastrointestinal mucosa are by no means commonly observed. Hoffmann,[1] also, speaks of the infrequency of hemorrhages in chlorosis, and contrasts chlorosis in this respect with other blood-diseases. The conclusion, hence, appears justifiable that *gastrointestinal hemorrhages cannot be regarded as the sole cause of chlorosis*. It is the writer's belief that when they occur they are the *result* of the anæmic condition, and not the cause.

Murri[2] likewise regards chlorosis as a vasomotor neurosis. According to him, an unequal distribution of the blood and an abnormal rapidity of flow, both of which are the result of abnormal impulses starting from the generative organs of the female, constitute the essential factors. Owing to the abnormal excitability of the vasomotor nerves the blood accumulates in the bloodvessels of the viscera, while the peripheral circulation, in consequence of vaso-constriction, is slower than normal. These deviations from the normal circulation cause an increased destruction of red corpuscles, in consequence of the altered chemical composition of the blood. If, furthermore, the peripheral circulation is more especially disturbed by cold and similar causes, the already existing anæmia is still further increased. As Murri has not yet published his observations in detail, it is impossible to analyze his hypothesis at present. So much, however, is certain that cold is capable of exerting a most deleterious influence upon the blood of chlorotic patients. v. Noorden[3] thus cites two cases of chlorosis in which, following the application of cold douches and the wet sheet, the previously light-colored urine became dark and very rich in hydrobilirubin, which modern researches have shown to indicate an increased destruction of hæmoglobin. The observation, moreover, is quite common that chlorotic patients frequently are made distinctly worse when permitted to indulge in sea-bathing without previous preparation. v. Noorden, however, states that he does not attach much importance to his observations upon the effect of cold as far as the etiology of chlorosis is concerned, and adds that similar results may frequently be obtained in the case of weakly patients.

It has been pointed out that Pick considers chlorosis the result of an

[1] F. A. Hoffmann : Lehrbuch der Constitutionskrankheiten, p. 45. Stuttgart, 1893.

[2] Murri : Pathogénie de la Chlorose. Semaine Méd., 1894, p. 162.

[3] v. Noorden : Lehrbuch der Pathologie des Stoffwechsels, pp. 265–346.

autointoxication, and that he claims to have obtained good results from gastric lavage and the administration of creosote.

Clark[1] may be regarded as the principal exponent of this school; but while Pick refers the autointoxication to atony and dilatation of the stomach, Clark regards the constipation which so often accompanies chlorosis, and the absorption of poisonous products of albuminous putrefaction, as the essential causes of the disease. This view is also held by Nothnagel.[2]

According to Bunge,[3] increased intestinal putrefaction, resulting in an increased production of sulphuretted hydrogen, must be regarded as the primary cause of chlorosis. He reasons as follows: during the period of puberty the female assimilates an excess of iron and stores it in the liver, in order to supply the fœtus, when pregnancy occurs, for the first year. Whenever, then, this process is interfered with, in consequence of the excessive production of sulphuretted hydrogen in the intestinal tract, the iron which is introduced in the form of food being transformed into insoluble sulphide of iron, chlorosis will result if the accumulation of iron still continues. The increased degree of intestinal putrefaction Bunge and his followers refer to a deficient secretion of hydrochloric acid in the stomach. The correctness of the hypothesis that chlorosis is essentially the result of an autointoxication, due to increased intestinal putrefaction, has been rendered doubtful by the researches of Rethers,[4] who found that the conjugate sulphates were usually not increased in cases of chlorosis.

In a previous communication[5] the writer has pointed out that in diseases of the stomach the elimination of indican must be considered as the more important factor in the determination of the degree of intestinal putrefaction, as the phenols are not necessarily produced in excessive amounts, so that the estimation of the conjugate sulphates does not furnish as valuable information as the examination for indican. It was, hence, thought advisable to examine systematically the urine of chlorotic patients. Attention was at the same time directed to the existence of constipation. The results obtained are given in Table III.

An analysis of this table shows that an excess of indican in the urine of chlorotic patients is rather the exception than the rule, and that while constipation exists in the majority of cases, normal relations are found in a not inconsiderable number.[6] The conclusion thus appears

[1] Clark: Chlorosis. Lancet, 1887, ii. p. 1003.

[2] Nothnagel: Ueber Chlorose. Wiener med. Presse, 1891, p. 1925.

[3] Bunge: Physiologische Chemie, 1887, p. 86; also, Verhandlungen des Congresses für innere Medizin, 1895.

[4] Th. Rethers: Beiträge zur Pathologie der Chlorose. Diss. Berlin, 1891.

[5] C. E. Simon: Modern Aspect of Indicanuria. AMERICAN JOURNAL OF THE MEDICAL SCIENCES, July and August, 1895.

[6] The writer has pointed out at various places that constipation in itself does not cause increased indicanuria; this fact is also well shown in the table. See C. E. Simon, Clinical Diagnosis. Philadelphia, 1896.

justifiable that *constipation and increased intestinal putrefaction, as far as the known aromatic bodies are concerned, cannot be regarded as essential factors in the production of chlorosis.*

TABLE III.

No.	Name.	Sex.	Age	Hb.	HCl.	Indican.	Atony.	Dilatation.	Gastroptosis.	Nephroptosis.	Constipation.	Remarks
				pr.ct.								
1	Miss B.	F.	20	50	Increased.	Increased.	No.	No.	No.	No.	Yes.	Ulcus ventriculi.
2	Miss T.	F.	24	45	Increased.	Not increased.	No.	No.	No.	No.	No.	
3	D. S.	F.	29	28	Increased.	Not increased.	No.	No.	No.	No.	Yes.	
4	Miss S.	F.	22	55	Absent.	Increased.	No.	No.	No.	No.	Yes.	
5	Miss S.	F.	17	60	Diminished.	Increased.	No.	No.	No.	No.	Yes.	
6	Miss R.	F.	30	50	Normal.	Not increased.	No.	No.	No.	Yes.	No.	
7	Miss G.	F.	?	35	Normal.	Not increased.	No.	No.	No.	Yes.	No.	
8	Miss S.	F.	19	55	Absent.	Increased.	No.	No.	No.	Yes.	No.	
9	Miss A.	F.	24	35	Absent.	Increased.	Yes.	No.	Yes.	No.	Yes.	
10	Miss B.	F.	29	60	Increased. 0.3 pr.ct.	Normal.	Yes.	No.	Yes.	Yes.	No.	
11	Miss B.	F.	15	40	Normal.	Not increased.	No.	No.	No.	No.	No.	
12	A. B. B.	F.	17	25	Increased. 0.5 pr.ct.	Not increased	Yes.	No.	No.	No.	No.	
13	Miss S.	F.	20	25	Diminished.	Increased.	Yes.	No.	Yes.	No.	No.	
14	Miss B.	F.	28	40	Increased. 0.5 pr.ct.	Not increased.	Yes.	No.	No.	Yes.	No.	
15	Miss B.	F.	24	55	Normal.	Not increased.	No.	No.	No.	No.	No.	
16	Miss F.	F.	25	50	Diminished.	Increased.	No.	No.	No.	No.	No.	
17	Miss H.	F.	?	50	Diminished.	Increased.	No.	Yes.	No.	Yes.	No.	Ulcus.
18	Miss K.	F.	?	45	Normal.	Not increased.	No.	No.	No.	No.	No.	
19	Miss Y.	F.	22	25	Normal.	Not increased.	Yes	No.	Yes.	Yes.	No.	
20	Miss L.	F.	25	65	Normal.	Not increased.	Yes.	No.	No.	Yes.	No.	
21	Miss B.	F.	18	45	Increased. 0.5 pr.ct.	Not increased.	Yes.	No.	No.	No.	Yes.	
22	Miss S.	F.	24	75	Normal.	Not increased	No.	No.	No.	Yes.	No.	Has been under treatment for chlorosis.
23	Miss W.	F.	19	75	Diminished.	Increased.	Yes.	No.	No.	No.	No.	Has been under treatment for chlorosis.
24	Miss G.	F.	19	25	Absent.	Not increased.	Yes.	No.	Yes.	Yes.	Yes.	Lactic acid.
25	Miss H.	F.	21	20	Absent.	Not increased.	Yes.	No.	Yes.	Yes.	Yes.	Lactic acid.
26	E. W.	F.	17	37	....	Not increased.	No.	No.	No.	No.	Yes	
27	M. G.	F.	15	33	Increased.	Not increased	Yes.	No	Yes.	Yes.	Yes.	
28	M. C.	F.	24	18	Increased.	Increased.	Yes.	No.	No.	No.	Yes.	Ulcus.
29	L. S.	F.	30	30	Normal.	Not increased.	Yes.	No.	No.	No.	Yes.	
30	A. W.	F.	35	33	Normal.	Not increased.	No.	No.	Yes.	Yes.	Yes.	
31	E. B.	F.	12	55	Absent.	Increased.	Yes.	No.	No.	No.	No.	

It has been pointed out that Bunge and others regard a diminished secretion of hydrochloric acid in the stomach as the principal cause of increased putrefaction, and, hence, as the primary cause of chlorosis. It will be necessary then to study briefly the various observations which have been made in this direction.

Manassein[1] was the first to note that, in animals, during fever and in anæmic conditions practically no gastric juice is secreted, and, hence, concluded that in the human being also the secretion of hydrochloric acid is diminished in anæmic conditions, such as chlorosis.

Zander[2] found that better results are obtained in the treatment of chlorosis under the administration of hydrochloric acid than of iron, and thus arrived at the same conclusion.

Mordhorst[3] takes the same stand, as he claims to have found a smaller amount of hydrochloric acid, on an average, in cases of chlorosis than normally.

Lenhartz,[4] using Congo-red as a test, observed the absence of free hydrochloric acid in 45.6 per cent. of his cases, and also states that on an average the total acidity was below normal.

Rosenbach[5] obtained similar results.

Ritter and Hirsch,[6] employing the method of Kahn and v. Mehring, likewise found amounts which on an average were below normal, but not to a marked degree.

Increased amounts of free hydrochloric acid were found by Riegel, Grüne, Osswald, Schätzell, and Cantu.

In three cases of chlorosis which were carefully studied by Riegel[7] the total acidity in terms of hydrochloric acid corresponded to 0.22 to 0.26 per cent. in the first, 0.23 to 0.30 per cent. in the second, and 0.28 to 0.46 per cent. in the third. In this manner he explains the not infrequent occurrence of gastric ulcer in cases of chlorosis and the anæmias in general.

Grüne[8] obtained amounts exceeding 0.5 per cent. In one instance he found 0.58 per cent. He states that he never found less than 0.28 per cent. His material consisted of twenty-eight cases, in nine of which the chlorosis was associated with ulcer.

Schätzell[9] observed hyperacidity in 73 per cent., a normal acidity in 20 per cent., and subacidity in 7 per cent. of his cases.

Osswald[10] examined twenty-one cases and found a total acidity, corre-

[1] Manassein: Virchow's Archiv, 1872, vol. lv.
[2] Zander: Virchow's Archiv, 1881, vol. lxxviii.   [3] Mordhorst: Diss. Kiel, 1893
[4] Lenhartz: Deutsche med. Wochensch., 1890, No. 5.
[5] Rosenbach: Entstehung und Behandlung der Chlorose. Leipzig, 1892.
[6] Ritter und Hirsch: Zeitsch. für klin. Med., vol. xiii. p. 430.
[7] Riegel: Zeitsch. für klin. Med., vol. xii.; also Deutsche med. Wochensch., 1886, No. 52.
[8] Grüne: Diss. Giessen, 1890.
[9] Schätzell: See Hoffmann's Constitutions-Krankheiten.
[10] Osswald: München. med. Wochensch., 1894, Nos. 27 and 28.

sponding to 0.20 per cent., in only two cases; in the greater number more than 0.25 per cent. was found, and in some instances even 0.5 per cent. The amount of free hydrochloric acid varied between 0.07 and 0.25 per cent , with an average of 0.15 per cent.

Leube[1] states that while subacidity is the rule in chlorosis, exceptions are not uncommon.

Cantu[2] claims that hyperchlorhydry is characteristic of chlorosis, which may thus be distinguished from other forms of anæmia.

On the other hand, there are observers who maintain that no rule can be laid down regarding the secretion of hydrochloric acid in cases of chlorosis. Rosenheim,[3] v. Noorden,[4] Buzelygan[5] and Gluzinski, and Hoffmann[6] found an increased degree of the total acidity in some, and in others a diminished amount, but in both groups but little beyond the normal. Usually the secretion of hydrochloric acid was normal. The same conclusion has also recently been reached by Schroth.[7]

The author's results are given in Table III.

Salzer's test-meal was employed in every case. For breakfast the patient received 30 grammes of lean, cold roast beef, hashed or cut into pieces sufficiently small not to obstruct the lumen of the stomach-tube, 250 c.cm. of milk, 60 grammes of rice, and one soft-boiled egg. Exactly four hours later the second meal was taken, consisting of 35 to 70 grammes of stale wheat-bread and 300 to 400 c.cm of water. The gastric contents were withdrawn one hour later. In this manner the gastric juice is not only obtained at the height of digestion, but an idea may at the same time be formed of the motor power of the stomach. Under normal conditions the organ should not contain any remnants of the first meal at the time of examination. The free hydrochloric acid was determined according to Töpfer's method, using dimethyl-amido-azo-benzol as an indicator.

An analysis of this table shows that normal amounts were found in 33.3 per cent., hyperchlorhydry in 30 per cent., hypochlorhydry in 16.6 per cent., and anachlorhydry in 20 per cent. It is thus clear that no definite rule can be laid down regarding the secretion of hydrochloric acid in cases of chlorosis. *Neither hyper-, hypo-, nor anachlorhydry can be regarded as the cause of chlorosis.* In the author's estimation, the abnormal results must be explained by the existence of a general neurotic condition, which is frequently observed in cases of chlorosis. In this connection it is of interest to note that increased indicanuria is not found in the majority of chlorotic patients, thus confirming the

[1] Leube : Spezielle Diagnostik., 1893.
[2] Cantu : München. med. Wochensch., 1894, No. 14 (ref.).
[3] Rosenheim : Lehrbuch der Verdauungs-Krankheiten, vol. i.
[4] v. Noorden : Arbeiten über Chlorose. Berlin. klin. Wochensch., 1894, No. 4.
[5] Buzelygan und Gluzinski : Internat. klin. Rundschau, 1891.
[6] Hoffmann, loc. cit.   [7] O. Schroth : Diss. München, 1896.

author's view that increased indicanuria may be regarded as indicating the existence of hypo- or anachlorhydry, if we except ulcer, in which case an increased elimination of indican is usually found associated with hyperchlorhydry. (See Table III.)

Haig[1] has recently suggested an increased production of uric acid, the result of digestive disturbances, as the cause of anæmia and chlorosis. This view the writer cannot share, as in his experience an increased elimination of uric acid is less frequently observed in chlorosis than in conditions which are not associated with anæmia. There is no reason why an increased production of uric acid should take place in chlorosis without a correspondingly increased elimination.

The hypothesis that chlorosis is referable to the repeated losses of blood during the process of menstruation need not be considered, as the disease not infrequently occurs in females before menstruation has been established. It would be difficult, moreover, to explain the reason why chlorosis results in such an infinitesimally small percentage of cases when compared with the total number of menstruating females.

Those, finally, who regard chlorosis as an infectious disease have still to demonstrate the specific bacillus. The occasional occurrence of enlargement of the spleen can hardly be regarded as sufficient evidence. Schroth[2] has met with splenic enlargement only twice in his series of cases, and the writer has only one case of this kind to report in a total of thirty-one cases.

From the brief analysis of the various hypotheses that have thus been offered to explain the etiology of chlorosis it is clear that *there is not one which can be regarded as entirely satisfactory. This statement, however, presupposes the unity of the disease.*

The classification of the various forms of anæmia in use at the present time appears to the writer very unsatisfactory. Strümpell[3] divides the anæmias into primary and secondary anæmias, and under the heading "simple constitutional anæmia" speaks of chlorosis and progressive pernicious anæmia.

Osler[4] likewise distinguishes between a primary and a secondary form, and subdivides the former into chlorosis and progressive pernicious anæmia. From his account it is not clear whether or not he regards the "simple constitutional anæmia" of Strümpell as a form of chlorosis. He merely defines chlorosis as an "essential anæmia met with chiefly in young girls, characterized by a marked relative diminution of the hæmoglobin."

[1] Haig: Causation of Chlorosis. Brit. Med. Journ., 1893, p. 672.
[2] Schroth, loc. cit.
[3] Strümpell: Lehrbuch der speziellen Pathologie und Therapie der inneren Krankheiten, vol. ii. 2, p. 178.
[4] Osler: Practice of Medicine, 1st ed., p. 684.

Not many years ago it was thought that chlorosis occurred only in females about the age of puberty. From time to time cases have been observed, however, in which the chlorotic symptoms appeared much earlier; and Rieder[1] has recently pointed out that the disease may develop much later. He cites three carefully studied cases, occurring in females, in which the disease appeared at the age of thirty, forty, and forty-two years respectively. As criterion he regards: the occurrence of anæmia in the absence of a demonstrable cause, the absence of organic disease, the occurrence of a diminution in the amount of hæmo-globin associated with a fairly normal or but slightly subnormal number of the red corpuscles, and rapid improvement upon the adminis-tration of iron.

It appears to the writer that too much stress has been laid upon the occurrence of menstrual abnormalities and the "chlorotic" facies in the diagnosis of the disease. It would be better to discard the term "chlorosis" altogether, as it has reference to a symptom only, viz., the greenish-yellow hue of the skin, which is by no means always observed, its occurrence being largely restricted to brunettes. The abnormalities in the menstrual function can likewise not be regarded as characteristic of the disease, as chlorosis is not only observed before the menses have appeared, but amenorrhœa, menorrhagia, and normal menstruation may all be observed in the course of an attack. Chlorosis, moreover, has also been met with in the male, and the writer's experience has led him to the conclusion that it is not at all rare in that sex. It has been men-tioned above that rapid improvement in the condition of the blood following the administration of iron is by some regarded as a criterion in the diagnosis. This can hardly be said to hold good, as cases of chlorosis are frequently seen in which the effect of iron is practically *nil*. There remains for consideration the significance of the condition of the blood. Modern writers state that a diminution in amount of the hæmoglobin, altogether out of proportion to the diminution in the number of the red corpuscles, is characteristic of chlorosis, and may serve to differentiate this form of anæmia from all other forms, viz., progressive pernicious anæmia and the secondary anæmias. It is true that in the majority of cases of chlorosis the number of red corpuscles is practically normal. Thayer[2] found the average number per cubic millimetre of the red cor-puscles in forty consecutive cases to be 4,225,181, or over 80 per cent. of the normal, while the percentage of hæmoglobin for the total number was 44.1 per cent. Not rarely, however, cases are seen in which the red corpuscles are greatly diminished in number. Osler states that the lowest count in the series of cases just referred to was 1,932,000. In such ex-

[1] Rieder: Einige Bemerkungen über das tardive Auftreten der Chlorose. München. med. Wochensch., 1893, p. 225.

[2] Thayer: Cited by Osler, loc. cit.

treme instances it will be found that the percentage of hæmoglobin is still lower. If we regard this symptom as pathognomonic of chlorosis, it must also be admitted that the definition of chlorosis must be extended, so as to comprise not only girls about the age of puberty, but also children and adults of both sexes. The writer systematically examined the blood of a large number of patients, and found that a diminution in the amount of hæmoglobin, associated with a normal or but slightly subnormal number of red corpuscles, is far more frequently encountered than is generally supposed, in the absence of organic changes. He has observed, moreover, that "chlorosis" is very commonly seen in children of both sexes between the third and twelfth year, as also in the adult female and in males about the age of puberty and up to the twenty-third year. It was less frequently found in males after the thirtieth year.

In the following table the hæmoglobin estimations and the number of red corpuscles are given in a number of male patients. Organic changes could be excluded in every instance:

TABLE IV.

No.				Name.	Sex.	Age.	Corpuscles.	Hb.	
1	.	.	.	R. G.	M.	8	4,236,256	45	per cent.
2	.	.	.	L. H.	"	32	3,476,191	33	"
3	.	.	.	M. T.	"	15	4,565,332	48	"
4	.	.	.	J. H.	"	19	4,435,261	42	"
5	.	.	.	O. H.	"	30	5,221,113	58	"

The question arises : What is the smallest amount of hæmoglobin that may be met with in health? The writer's experience has led him to the conclusion that amounts of hæmoglobin corresponding to 100 or over of Fleischl's instrument are only exceptionally seen in city-dwellers, and that figures varying between 80 and 100 must be regarded as normal for such persons. Percentages lower than 70, when associated with a fairly normal number of red corpuscles, or a diminution less than that of the hæmoglobin, should be regarded as indicating a condition of chlorosis, or of *simple anæmia*, a term which the writer prefers.

If we thus extend the definition of the term "chlorosis," it will be found that the hypotheses set forth above become wholly untenable, providing, of course, that chlorosis constitutes a unity. Congenital hypoplasia, the wearing of corsets, with its attendant evils, viz., compression of the thorax and abdomen, splanchnoptosis, menstrual abnormalities, vasomotor neuroses depending thereupon, autointoxication, as far as our present knowledge goes, are all factors, none of which can be said to be uniformly associated with chlorosis. *As a result of his*

study, the writer has been led to the conclusion that in the great majority of cases chlorosis is essentially a disease of malnutrition, the result very frequently of abnormal feeding in early childhood. Objections may be raised to this opinion on the ground that chlorotic patients are usually well nourished and frequently exhibit a perfectly normal appetite as to the quantity of food; in such cases also the proteid metabolism has been found to be normal.

The latter argument may be answered first. It is true that the proteid metabolism will be found normal, if the case be studied at a hospital, where the patient is obliged to eat what is placed before him, and where he ingests weighed quantities of food. *The chlorotic patient is capable of not only digesting a normal amount of proteid material, but also of assimilating the products of digestion.* It would be faulty, however, to argue from the fact that experiments upon metabolism show a patient to be capable of digesting and assimilating definite quantities of food that the patient's nutrition is not impaired. Metabolic experiments will show that the poor, hard-worked, and ill-fed shop-girl can digest and assimilate a normal amount of nitrogenous food, but experiments are not necessary to show that the same girl's diet at home is widely different from that which she receives in a hospital.

The fact that chlorotic patients are usually well nourished cannot be regarded as a valid objection to the writer's view. In the better-to-do classes it is true that the patients usually, but not always, appear plump and well fed. A superficial examination, however, will show at once that the muscular system is not well developed and that the plump appearance is simply due to excess of fat. In that sense the German beer-drinker with his *embonpoint* and the fat woman of the dime-museum are also well nourished. An excessive deposit of fat does not indicate normal nutrition. The fat chlorotic patient can well be compared to a typical case of obesity, and anæmia is practically common to both. Among the poorer classes, on the other hand, the muscular system is not only usually defectively developed, but fat is also frequently lacking. Every physician probably has seen cases of chlorosis in which the body-weight was ninety-five pounds, or even less.

As to the third objection, namely, that the appetite of chlorotic patients is often normal as to quantity, the writer is willing to admit its truth. He maintains, however, that it is rarely normal as to quality. The capricious appetite of chlorotic girls is proverbial. Their longing for undigestible articles, such as acids, chalk, charcoal, earth, and even spiders, is well known. At the Johns Hopkins Hospital the writer had occasion to study three chlorotic girls—intimate friends—who invariably carried with them a box containing pepper and salt. Of this they partook with apparent relish, and as frequently as Mynheer of fifty years ago consulted his snuff-box. It is not the writer's intention to dwell

upon this form of capricious appetite, however, but to point out the fact that a similar perversion exists regarding staple articles of food. The following cases may serve as illustrations:

Case I.—M. C., aged twenty-four years. Intense chlorosis. The patient has scarcely ever touched any form of meat but fish. Of the latter she is inordinately fond—particularly when salted. While being treated for ulcer of the stomach, which complicated her condition, she bribed the servants of the house to bring her a piece of salted mackerel. For fats and sweets she has no liking. Toast and tea, with salted fish, have been her usual articles of diet for several years.

Case II.—A. B., aged twenty-one years; male; this patient has never even *tasted* meat. Since childhood he has lived on little else than milk, coffee, and bread.

Case III.—C. G., aged five years. Will not touch meat; lives mostly on potatoes, bread and butter, and coffee.

Case IV.—E. B., aged twelve years. Will eat chicken and turkey, potatoes, bread and butter, milk, and baked apples. Of the latter, as well as candies and cakes, she is very fond. Meats other than those mentioned she will not eat.

Case V.—E. W., aged seventeen years. Will not eat beef or mutton; does not like milk; eats potatoes, corn- and buckwheat-cakes, oatmeal, occasionally a little breast of chicken; is very fond of candies.

Case VI.—M. G., aged sixteen years. Rarely eats meat; is a great candy-eater.

Case VII.—M. H., aged twenty-three years. Lives principally upon toast and tea; rarely touches meat.

Careful questioning, in the writer's opinion, will almost always reveal the fact that chlorotic patients consume a very small amount of nitrogenous food, and particularly of the red meats. The majority of patients are potato-fed and inordinately fond of sweets in every form. On the other hand, cases are met with where meat is consumed in moderate amounts, but usually this is improperly prepared, viz., fried and well-done. Such patients probably obtain more fatty acids than digestible proteid material in this manner.

If the urine of chlorotic patients be systematically examined, the correctness of the writer's statement can be readily demonstrated. The specific gravity is almost always low. Inferences should, however, only be drawn when the specific gravity is determined from a specimen taken from the total quantity of urine voided in the twenty-four hours. The inorganic salts, especially the chlorides and phosphates, are likewise diminished. Most important of all, the elimination of nitrogen is diminished. There are a few exceptions in which the specific gravity and the elimination of nitrogen are increased, and which the writer is not prepared to account for; the rule, however, is that *in chlorosis we meet with a subnormal elimination of nitrogen, referable to the ingestion of an insufficient supply of proteid food, and especially of red meats.* It is the writer's belief that the great majority of cases of chlorosis are thus

primarily produced, and that the various other factors, which have been incidentally mentioned, serve to aggravate the anæmic condition and render it less tractable.

As to the question, How is this perversion of the appetite brought about? it may be said that in early infancy the tendency on the part of physicians and parents is to overfeed; later, when the teeth have appeared and solid food should enter into the child's dietary, the opposite mistake is frequently made. A simple query as to the child's appetite will not reveal the error, as usually the answer is that the appetite is good. If, however, a careful inquiry be made as to what the child eats, it will be found that while a fair amount of milk is consumed, potatoes, cornstarch, bread, and the inevitable chicken-bone form the principal articles of diet. Is it surprising that the child should look pale? Certainly not. Children require much more proteid food in proportion to their body-weight than adults. If iron is then prescribed, a slight improvement may follow, but it is rarely marked, and more often *nil*. Of the correctness of this statement the writer has had occasion to convince himself again and again. Unless proteid food be administered in abundance—and it should be remembered that a child with all its teeth requires a coarser form of diet than milk—it will grow up weak and puny. A distaste for animal food develops and an attack of genuine chlorosis results when demands are made on its nervous system at school. Here the child is regarded as stupid and lazy because it does not accomplish its allotted work as well as other children. "It is kept in school" as a punishment, upbraided by its teachers, teased and worried by its comrades, until finally the increased exertions result in a breakdown. A case in point may serve as an illustration:

R. G., aged eight years. As a baby the child was at first nursed by its mother, but was later brought up "on the bottle." Up to the time the milk-diet was discontinued the general health was good. Various "paps," potatoes, and "chicken-bones" were then added by the mother. Later it was noticed that the child was pale, nervous, easily frightened, twitched in arms and legs and the muscles of the face, had night-horrors, and notwithstanding bodily punishment would wet its bed almost every night. A phimosis was found and circumcision performed. Iron was ordered in small doses, and continued off and on for the next year. The improvement was practically *nil*. The child continued anæmic and nervous up to the age of five years, when it was sent to a private kindergarten. The nervousness increased, and the child was taken away. At the age of six years it was sent to school. Reading and writing lessons apparently did not affect the child in a deleterious manner. Arithmetic, however, proved to be the stumbling-block. The nervousness increased, the anæmia became worse, and was aggravated by a severe attack of influenza. A loud systolic murmur developed at the base; palpitations, shortness of breath, and general exhaustion were the result of even slight exertion. Iron, arsenic, and manganese were all tried, with no benefit. The child's appetite craved starchy food. School was

stopped, several months spent in the country (the child had lived in the country to its fourth year), no medicine was ordered, but a liberal proteid diet with bone-marrow and imported Bavarian beer. In the fall of the same year the murmur had almost entirely disappeared, the general nutrition had improved, and 75 per cent. of hæmoglobin was found with Fleischl's hæmometer.

Here a typical attack of chlorosis developed in a child at the age of six years, in which medication was of no avail, but in which a liberal proteid diet led to a fairly satisfactory result.

Other cases occur in which the child has been fairly healthy during its early childhood, but in which the chlorosis develops during the years of school-life. There can be no doubt that the mental strain is a most important factor, particularly in the case of children who have not inherited a strong constitution. The development of the sexual instinct and its common result, masturbation, moreover, deserve consideration. The writer believes that far too little attention is paid to this subject not only by parents, but also by physicians. In the case of boys the problem is not nearly so difficult to deal with, as the physician, if he suspects the practice of masturbation, will usually not hesitate to direct the father's attention to the existing evil. In the case of girls, however, he will frequently hesitate to communicate his suspicions to the parents. They would be shocked were they told that their daughter is a masturbator. The mere insinuation of such an idea would undoubtedly frequently drive the family to a more "gentlemanly" physician. Masturbation, however, is almost as common among girls as among boys, with the exception perhaps that the habit is not begun so early in the female as in the male. Without doubt, however, masturbation, particularly in weakly children, must be regarded as a most important predisposing cause of chlorosis. The writer has again and again observed that the sediment of urines from masturbating young girls contains very large numbers of epithelial cells, derived from the external genitals, and he believes this appearance to be fairly pathognomonic of masturbation, particularly if an appreciable amount of mucus is present at the same time.

While these factors, viz., mental strain and masturbation, must be regarded as important predisposing causes, a perversion of the appetite, and the resulting malnutrition, are still more important, according to the writer's experience. In the morning the child commonly hastens off to school without having had a sufficient breakfast. If a lunch be taken along, it is often either insufficient in amount, or it has become distasteful by the time recess occurs. The pies and buns which can be readily procured in the neighborhood are, hence, preferred; candies also play their part; and at three o'clock, when the child returns home, the appetite is gone. A late dinner does not mend matters much, and ere long, in consequence of an insufficient supply of food of unsuitable

quality, bad air, the continuous confinement in the same position, mental strain, and masturbation, a chlorotic attack follows in those who have not entered upon life with a specially good constitution.

Among the poorer classes it is well known that a sufficient quantity of suitably prepared meat is only exceptionally found upon the dinner-table. Tea and toast are a form of diet upon which many poor shop-girls live almost exclusively. Lentils, peas, and beans are not sufficiently *aristocratic* for those who are earning *enough* money to buy them. Potatoes, fried meat swimming in fat, oatmeal, corn-, buckwheat-, and griddle-cakes, hot bread, buns, fried tomatoes, tea and coffee are the articles of food most commonly consumed by the laboring classes. Were less money expended by them in imitating the household and habits of the wealthier classes, their children would not so frequently present the puny, anæmic appearance which has given rise to the establishment of fresh-air funds and country homes.

Among young adults it is also usually possible to trace the anæmic condition to an insufficient supply of proteid food. Sedentary habits, sexual excesses, mental strain, worry, grief, are all factors which will lead in time to a general breakdown. The appetite is soon affected, this and that article of food is thought to disagree and is abandoned, until finally a condition develops where the patient is practically starving. The anæmia is thus readily accounted for. A few examples may not be out of place:

N. C., aged thirty years. The family history is fair: the father died from nephritis; the mother, two sisters, and two brothers are living and well. As a child the patient passed through the usual diseases. Her health was good until eight years ago. Her weight then was 118 pounds. At that time her *fiancé* died quite suddenly. Her father's death occurred soon after. Symptoms of failing health began to appear. Her appetite diminished, loss of flesh occurred, weakness resulted, the bowels, regular heretofore, became sluggish. The patient went from bad to worse. Sanitariums were frequented. Amenorrhœa occurred, and a gynecologist was called in consultation. No improvement resulted, and a condition of complete invalidism developed. No hysterical symptoms. When the patient was first seen she weighed 74 pounds, and had only 20 per cent. of hæmoglobin, while the red corpuscles numbered about 3,000,000. Examination of the head, chest, arms, and legs was negative. There existed, however, an exaggerated grade of splanchno-ptosis. Examination of the stomach showed moderate atony and hyperchlorhydry. The urine was negative. The patient, who had gradually discarded one article of food after the other, fearing that it disagreed, was placed upon appropriate diet, in which animal proteids predominated. No medication beyond nux vomica was employed. In the course of eight weeks the patient's weight had increased to 86 pounds, and the hæmoglobin had reached 60 per cent.

An attack of true chlorosis here developed following intense grief, which led to perversion of the appetite and profound anæmia. Marked

improvement resulted from the administration of large amounts of proteid food.

Miss X., aged twenty-eight years. The patient's family history is good. Up to the age of twenty-four years she had been strong and well, excepting the usual diseases of childhood. She was engaged to a young man with no prospects of an early marriage. Her evenings were generally spent with her *fiancé*. Her stomach-contents were examined at that time, as she began to complain of indigestion, general lassitude, and slight loss of flesh. Normal results were obtained. The right kidney could then be felt below the costal margin. Heart, lungs, etc., were all normal. A few days later diarrhœa occurred without a demonstrable cause; the urine, which had previously contained a normal amount of indican, gave a most intense reaction, and after Ewald's test-meal not a trace of free hydrochloric acid was found. It was then ascertained that during the preceding evening she had become highly excited sexually, and that an orgasm had occurred without intercourse. A few days later her condition was normal. The following week there was a repetition of the attack, called forth in the same manner. This occurred several times, until the patient was sent to the seashore, without her *fiancé*. Upon her return she was decidedly anæmic; hæmoglobin 25 per cent.; the menses were irregular; marked dyspeptic symptoms existed; there were loss of appetite, constipation, and general prostration. The kidney, moreover, could be felt in the right iliac fossa. She was now given Blaud's pills for three months; after that time the hæmoglobin had increased only to 43 per cent. The iron was then stopped and a liberal proteid diet ordered. She steadily improved, and the last examination showed 84 per cent. of hæmoglobin.

In this case an attack of profound chlorosis developed from ungratified sexual desire; dyspeptic symptoms and anorexia followed, resulting in anæmia. Recovery occurred upon the administration of a liberal proteid diet.

It would be an easy matter to detail many such cases. The writer believes, however, that he has sufficiently demonstrated that *chlorosis is in the great majority of cases the result of malnutrition, dependent upon the consumption of an insufficient amount or of an unsuitable quality of proteid food.*

Heretofore iron has played the most prominent *rôle* in the treatment of chlorotic patients, and Osler states in his *Practice:* "The treatment of chlorosis affords one of the most brilliant instances of the specific action of a remedy. Apart from the action of quinine in malarial fever, and of mercury and iodide of potassium in syphilis, there is no other remedy the beneficial effects of which we can trace with the accuracy of a scientific experiment." In a similar tone many other clinicians express themselves. The writer, however, cannot share this enthusiasm to such a degree. It is true that many chlorotic females show a marked increase in the amount of hæmoglobin when iron is administered. Blaud's pills, containing each two grains of the sulphate of

iron, when given in increasing doses certainly cause a marked increase in some cases. In many others, however, no result worth mentioning is obtained. The writer well remembers the large number of chlorotic patients which A. Robin kept in his wards at the Pitié of Paris, and which he was in the habit of showing to his students as cases in which iron produced no result.

TABLE V.
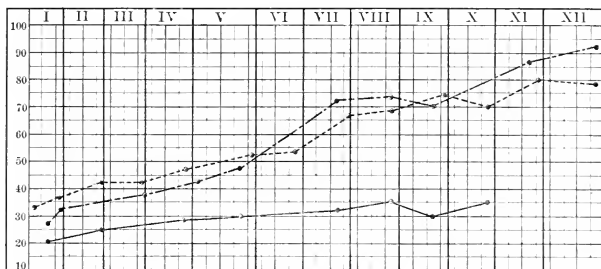
The broken line shows the more common effect of iron in chlorosis. (Taken from OSLER.)
The dotted line shows the effect of the writer's diet in a case in which no results could be obtained with iron.
The solid line shows the absence of any marked results with iron.
The heavy vertical lines have reference to intervals of one week.

The following two instances may serve as further proof that we are by no means justified in ascribing to iron a specific influence.

M. G., aged fifteen years. The patient's principal complaints are pain in the abdomen after meals, nausea, and slight elevation of temperature. The family history is good. At the age of five years she had a severe attack of scarlatina. In addition she has had the usual diseases of childhood. During the last two years she has been anæmic. The appetite is stated by the mother to be "most delicate." She is inordinately fond of candies. About fifteen minutes after meals she complains of a heavy feeling about the stomach, and, at times, of pain, which may be quite severe, but is relieved by pressure. Several times she has vomited. Quite frequently she has also had headaches. The bowels are fairly regular. There is no cough or expectoration. Once or twice, when in a crowded room, she has fainted. This patient has been treated for chlorosis, and had been taking iron (Blaud's pills) and Gude's pepto-mangan for two years practically without interruption. When first seen she had only 33 per cent. of hæmoglobin. The specific action of iron was certainly not manifest in this case.

E. W., aged seventeen years. This patient had likewise been taking iron, manganese, and arsenic for two years. On her father's side there is a history of tuberculosis; he himself, however, is living and well. On the mother's side the history is good. The patient has not passed through any serious illness, but has, nevertheless, been always ailing and

weakly. The usual chlorotic symptoms are very marked. The hæmoglobin does not exceed 37 per cent.

Every physician who has had occasion to observe a large number of chlorotic patients, and has followed the results of his treatment with the hæmometer, has undoubtedly met with similar cases in which the effect of iron was practically *nil*.

There still remains the fact, however, that iron is certainly beneficial in many instances. How can this be explained? In the opinion of the writer the beneficial effects obtained are simply due to a stimulating effect upon the appetite. The iron itself which is ingested certainly does not serve to increase the amount of hæmoglobin, as it has been shown that practically the total amount ingested is eliminated in the feces.

Numerous observations having shown that iron in the inorganic form frequently produces no satisfactory results in cases of chlorosis, other preparations have been placed upon the market from time to time. Among these may be mentioned ferratin, hæmoglobin, hæmatogen, hæmalbumin, etc. From the writer's observations there can be no doubt that these frequently produce better results than the ordinary inorganic forms of iron, but he also believes that the beneficial effects obtained, where iron in other forms has failed, are largely due to the proteid material which they contain.

During the last three years the writer has been in the habit of treating his cases of chlorosis without drugs, and he claims to have obtained results which at least are as satisfactory as those observed in cases in which iron exhibited its "specific" effect. Starting upon the hypothesis that an insufficient consumption of proteid food must be regarded as the causative factor in the great majority of cases of chlorosis, he has ordered for such patients a diet in which proteid material largely predominated. Before proceeding to detail this diet, it may be mentioned that it has been long known that with a diet composed exclusively of non-nitrogenous food the percentage of hæmoglobin undergoes a notable diminution, while it is augmented by a diet rich in proteids.

The diet which is ordered is given below. Additional instructions, however, are also given: Meals should be taken five times daily, viz., at 8 A.M., 11 A.M., 2 P.M., 5 P.M., and 7 P.M. Rest after meals is insisted upon whenever hyperchlorhydry is found to exist, while moderate exercise is advised whenever hypochlorhydry is found to exist. Ten hours of sleep, warm salt-water baths twice weekly, dry friction in the morning, avoidance of society, etc., are other factors which enter into the plan of treatment.

Diet: Of meats the patient is instructed to indulge liberally in beef and mutton. Raw beef, finely hashed or scraped, is taken once daily, preferably at 11 A.M., on toast or stale bread, with pepper and salt.

The so-called white meats are only exceptionally allowed. At dinner-time the patient also receives from one-half to one ounce of bone-marrow, obtained from the shin-bone of the ox. This should be brought upon the table while hot.

Of vegetables, preference is given to *purées* of peas, beans, and lentils; but green and white vegetables are not excluded. Potatoes are either not given at all, or only once daily, and in small amount.

Of fruits practically all are permissible, with the exception of berries. These may, however, also be given in *purée* form, when deprived of their seeds. Apples are excellent and well borne in most cases.

Of bread, rye-bread is preferred; it should be twenty-four hours old. Toast, Zwieback, and rebaked bread are likewise allowed.

Puddings, pies, pastry, and preserves are interdicted. The same holds good for hot bread, corn-, buckwheat-, and griddle-cakes, and oatmeal.

Coffee and tea are prohibited; milk, buttermilk, cocoa (particularly those forms in which the fat has not been wholly extracted, such as Philips'), and a good quantity of dark beer (Salvator, Pschorr, Würz-burger, Klosterbräu, and Bartholomay's Ne Plus Ultra), one pint daily, constitute the beverages which are consumed in addition to one or two pints of water. The writer wishes to insist especially upon the value of dark beer in cases of chlorosis. One pint should be consumed daily; one tumblerful at 11 A.M., with the beef sandwich, and one just before retiring.

With the treatment thus outlined the writer has obtained most satisfactory results in the absence of medication, results, moreover, which compare very favorably with the best that have ever obtained with iron, manganese, and other preparations of a medicinal character.

This treatment is not new, and the writer does not lay claim to any originality in this respect. He simply wishes to emphasize its importance, and believes that we are more entitled to ascribe a specific action to a liberal proteid diet in cases of chlorosis than to iron or any other drug. We can, moreover, trace the beneficial results of this plan of treatment with the accuracy of a scientific experiment.

It is not the writer's intention to insist upon the treatment of every case of chlorosis with beef, bone-marrow, and beer. Among the poorer classes of people who frequent hospital dispensaries such a plan of treatment would be impossible to carry out. Iron may there be prescribed as heretofore. Among the better-to-do classes, on the other hand, the treatment which has been outlined should be invariably instituted whenever a brief course of iron has not led to a satisfactory result. It is useless to drug such patients continually.

In conclusion, a few words regarding the value of bone-marrow in the treatment of chlorosis may not be out of place. As far as the writer has been able to ascertain, the first observations in this direction

were published by Billings,[1] who was led to his investigations by the reports of Fraser,[2] Bigger,[3] and Danforth[4] upon the value of extract of bone-marrow in cases of pernicious anæmia. Billings cites four cases which were thus treated. Two of these were cases of pernicious anæmia, the third a chlorotic girl, and the fourth a "chloro-anæmic" boy.

The bone-marrow was given in the form of a glycerin-extract, which was prepared in the following manner: "Twelve sheep's ribs, carefully scraped, were chopped into small fragments and rubbed up in a mortar with one pound of glycerin. This was allowed to macerate for three or four days, being kept in a refrigerator during that time. It was then strained through gauze and the resultant liquid administered in tea-spoonful doses three times a day."[5]

In the chlorotic girl 32 per cent. of hæmoglobin was noted upon admission to the hospital. For the first ten days no treatment was instituted. At the end of this time an increase of 6 per cent. was observed. The extract was then given for sixteen days, when the hæmoglobin amounted to only 40 per cent. In other words, while an increase of 6 per cent. resulted without treatment during the first ten days, a further increase of only 2 per cent. was observed after the patient had taken the extract for sixteen days. This observation is rather unfavorable for the value of red bone-marrow in chlorosis.

In the "chloro-anæmic" boy, on the other hand, an increase of from 35 to 68 per cent. was noted in one month. The administration of Blaud's pills, which was begun at the end of the month, did not, however, lead to a further increase at the end of the next two weeks. The bone-marrow in this case certainly gave more beneficial results than Blaud's pills.

Billings concludes: "The extract of bone-marrow may be of value in cases of ordinary anæmia and chlorosis, such as would be benefited by iron in other forms." He ascribes the benefit obtained in the one case to the iron which the bone-marrow contains.

As has been indicated above, the writer regards bone-marrow as a valuable article of diet in the treatment of chlorosis. Curiously enough, most benefit was obtained with the marrow of the long bones of the ox, of which one to one and a half ounces were administered daily. As the general plan of treatment already described was carried out in almost every instance, it is impossible to determine to what extent the improvement was due to the bone-marrow alone. In only three in-

[1] J. S. Billings: Therapeutic Use of Extract of Bone-marrow. Johns Hopkins Hospital Bulletin, November, 1894.

[2] Fraser: British Medical Journal, June 2, 1894.

[3] Bigger: Lancet, September 22, 1894.

[4] Danforth: Chicago Clinical Review, 1894, vol. iv.

[5] The glycerin-extract may be obtained from the Bureau of Diets, 525 North Charles Street, Baltimore, Md.

stances were the patients permitted to follow their usual mode of living. In these three cases an increase in the amount of hæmoglobin was also noted, but was certainly not so marked as in those in which special stress was laid upon the administration of a large amount of proteid food. On the other hand, it may be said that the increase in the amount of hæmoglobin was more rapid and more marked when bone-marrow also was given.

The writer is not prepared to offer any hypothesis as to the reason why bone-marrow is of value. The fact that practically the same results may be obtained with the yellow marrow of the long bones as with the red marrow certainly speaks against Billings's assumption that the beneficial results which may be obtained are due to the iron which marrow contains.

Abnormalities of "internal secretion" are correctly regarded as the basis of a number of diseases, among which may be mentioned myxœdema, cretinism, Basedow's disease, acromegaly, Addison's disease, pancreatic diabetes, and the affections shown to result from premature loss of the functions of the ovaries and testicles. It would be tempting to view chlorosis in this light. The writer does not feel justified, however, with the data at his disposal, to venture upon such a wide field for speculation.

Conclusions:

1. An anatomical basis of chlorosis has not been satisfactorily determined.

2. A perversion of the appetite—excessive consumption of starches and sugars—is a common symptom of chlorosis.

3. The development of chlorosis is due to an insufficient consumption of animal proteids.

4. Chlorosis is far more common than is generally supposed, and occurs in both sexes and at almost all ages.

5. The diagnosis of chlorosis should be based altogether upon an examination of the blood.

6. The term chlorosis should be discarded, and "simple anæmia" substituted.

7. Iron is not a specific in the treatment of chlorosis.

8. In the treatment of the disease attention should primarily be directed to the diet.

9. In cases in which iron fails satisfactory results may be obtained, without medication, from a suitable diet, in which animal proteids, bone-marrow, and dark beer are the principal factors.

10. The beneficial effects of bone marrow are not due to the amount of iron which it contains.

A CASE OF PUERPERAL SEPTICÆMIA TREATED BY ANTISTREPTOCOCCUS–SERUM.

By WALTER EDMUNDS, M.D.,

OF LONDON, ENGLAND.

MRS. F. C., aged twenty-six years, was admitted to hospital care April 15, 1896, with the history that she had been confined with her first child on February 2, 1896.

The labor had been difficult, chloroform was administered, and instruments had to be used. About a week later a rigor occurred, others followed, and they continued till her admission in April. There were also fever and pains, first in one joint and then in another.

The treatment had consisted in the administration of quinine and other drugs, curetting of the uterus on one occasion (a few days after the confinement), and the use of antiseptic douches.

On admission on April 15th the patient seemed very seriously ill. Temperature 103.6° F., heavy respirations, and (the day after admission) a rigor; the temperature 104°, the highest taken being 104.8°. There was also swelling of the whole of the left leg, and the ankle-joint was tender and painful on movement, but the knee-joint did not appear to be affected.

The patient was treated daily with subcutaneous injections of a streptococcus-antitoxin, of which the dose was said to be from 2 to 5 c.cm.; the dose given was 4 c.cm. This was continued for six days, and, after missing one day, for two days more. The patient was now much better; there had been no rigor for some days, her strength was better, the respirations less, and the temperature lower. It was thought that the injections might now be stopped, and this was desirable on account of the great swelling, redness, and local pain caused by them. Three days later—i.e., on the third day without the antitoxin—the left knee became painful and swollen. The antitoxin-injections were resumed, and on this and the next two days there were slight rigors. The treatment was continued for six days, when it was stopped, mainly on account of the irritation it produced. For four days the temperature continued low, but on the fifth day there was chilliness and a rise to 102.4°. On the seventh day, May 9th, the patient was so weak and ill that it was decided to try antitoxin again, and accordingly 20 c.cm. of an antitoxin obtained from a different source was administered. This was followed by a fall of the temperature, which became and remained nearly normal for the next few days, and the patient's condition generally also improved. No more antitoxin was given. On May 19th a small abscess in connection with the left ankle-joint was opened. It was quite subcutaneous; no anæsthetic was necessary and no drainage-tube was inserted. The abscess healed in a few days.

Patient continued to do well with about normal temperature, but on May 30th there was fairly distinct evidence of pus in the left knee-joint. An anæsthetic was administered, two incisions made, and a drainage-tube inserted. The pus from this abscess was examined. No growth of micro-organisms occurred from it in a gelatin-tube, but under the microscope it was seen to contain typical strings of streptococcus.

The drainage-tube was removed from the knee and the wounds healed. The patient continued to make good progress, and the temperature remained satisfactory till August 17th, when it rose to 102.4° and the patient felt chilly. The next day an injection of 10 c.cm. of an antitoxin from a third source was administered. This was followed by a fall of the temperature to about normal, and no further symptoms showed themselves. The patient is now (November) practically well, but the left knee is quite stiff, the movement of the left ankle-joint much limited, and there is also some limitation of the movement of the lower jaw, so that the mouth cannot be opened wide.

This case is free from two fallacies which sometimes interfere with judging of the effect of the antitoxin treatment. In the first place, it was a case of streptococcus infection shown by the examination of the pus from the knee; secondly, surgical treatment was not had recourse to at the same time as the administration of the antitoxin. The abscesses were not opened till long after the injections had been commenced and great improvement had already occurred.

At the time of admission the patient was so ill that it was thought doubtful whether she would recover. After a few days with the antitoxin treatment she was much better, the temperature lower, and the respirations much less. After the injections had been stopped two days the knee became affected (or, if previously affected, worse). The injections were used for six days; then, again, after an interval of six days without them, the patient was very ill and improved after a single injection.

Finally, the failure of the streptococci in the pus from the knee to grow may no doubt have been due to other causes than their having been killed or inhibited by the antitoxin; but it is quite possible that this was the cause.

My own belief is that the antitoxin saved the patient's life.

The injections produced, in varying degree, pain, erythema, and, on four occasions, an abscess. This may have been in part due to some decomposition having occurred in the serum after the bottle was opened, although much care was taken. It is desirable that the serum should be supplied in single-dose bottles. On one occasion the antitoxin was tested by us before use and found sterile, yet its injection was followed by an abscess. It must be remembered that in some of these cases large subcutaneous abscesses occur spontaneously, and that in this case suppuration occurred spontaneously in the knee and ankle.

<div align="center">REFERENCES.</div>

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IDIOPATHIC OSTEOPSATHYROSIS (FRAGILITAS OSSIUM) IN INFANCY AND CHILDHOOD.

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Except in old persons fragilitas ossium, or osteopsathyrosis, as it was first called by Lobstein (*Traité d'Anatom. Patholog.*, 1833, T. ii. 204), is a condition comparatively so uncommon that it receives but little attention from most writers of text-books, and that instances of it are always of interest. Even special articles of value upon the subject are few in number. The most exhaustive and satisfactory is the classical contribution by Gurlt (*Handbuch der Knochenbrüche*, 1862, Theil. i. 147), which contains a number of cases cited from medical literature. Among other writers Volkmann (Pitha-Billroth ; *Handb. d. allg. u. spec. Chirurg.*, 1865, B. ii., Abt. ii., Hlft. i. 365) gives a short but very useful review of the subject. Enderlen (*Arch. f. pathol. Anat.*, 1893, cxxxi. 223) collects a few cases additional to those of Gurlt, and the article by Linck (*Arch. f. Gynäkol.*, 1887, xxx. 264) is of value. More recently Schultze (*Arch. f. klin Chirurg.*, 1894, xlvii. 327) and Moreau (*Contribution a l'étude de la fragilité des os.* Paris, 1894) have written regarding it, limiting themselves largely to the idiopathic form. Simon (*Des fractures spontanées*, Paris, 1886) and Dubrueil (*Étude critique sur les fractures spontanées*, Paris, 1891) have discussed it in theses upon spontaneous fractures.

Several varieties of osteopsathyrosis may be distinguished. Thus we may have it either symptomatic to other affections or occurring idiopathically—*i. e.*, not associated with any discoverable cause. The symptomatic form depends upon various conditions. For instance, rhachitis is capable in many instances of occasioning actual transverse fracture, as well as great bending of the bones. Osteomalacia likewise may produce fractures, and sometimes to such an extent that an *osteomalacia fracturosa* (Kilian) has been described. Cases of fragilitas due to scurvy have also been reported, and it is possible that some of the instances of brittle bones in infants may be attributable to it. Syphilis has long been considered a cause of osteopsathyrosis. It is a disputed point whether congenital syphilis may occasion a general brittleness of the whole of the osseous system, depending upon some unrecognizable change in the structure of the bone, or whether the fractures are always the result of localized gummatous processes. The studies of cases by Gangolphe (*Malad. infec. et parasit. des os*, 1894) failed to show any instances of fragility of bone in congenital syphilis independent of local lesions, and Volk-

mann believes that syphilitic fractures are the result of a gummatous oste-
itis. There certainly seem to be good grounds for believing that at least
most of the cases of fragilitas attributed to the general effect of syphilis
are so attributed without good reason. Simon believes that both hered-
itary syphilis and scorbutus are more apt to occasion separation of the
epiphyses.

There are, further, a whole series of causes which probably produce
atrophy of the bone and consequent fragility. Many of these are of
a distinctly nervous nature. Thus we find fragility sometimes developing
in locomotor ataxia, poliomyelitis, and mental diseases. There are also
atrophic changes resulting from simple inactivity, and those commonly
attending old age. There is some question, however, whether the frac-
tures which so often and so easily occur in old persons depend always
on fragilitis, or whether they are not in many cases brought about by the
diminished power old persons have of guarding themselves against falls
and other accidents capable of producing fractures.

Finally, there is a series of local causes for fragilitas, among them
osteomyelitis, carcinoma or other malignant growth of the bone, gum-
mata, echinococcus or other cysts, and localized necrosis.

It is, however, only with idiopathic osteopsathyrosis that we have to
do in this connection, and, to narrow it still more, only with those cases
in which the disease begins in infancy or childhood. The following case
is a remarkable instance of the very early, almost congenital pres-
ence of the disease. I saw the child with Dr. B. H. Detwiler, of
Williamsport, Pa., to whom I am indebted for the facts of the clinical
history :

H. E., male, aged two years and ten months. The family history is
good, both parents and grandparents being unusually healthy people.
The only exception is that a brother of the mother had never been able
to walk, and died at the age of six years. His affection, however, seems
to have been rather a mental one than any involvement of the bones.
A brother of the patient died when five months old, apparently through
the effect of heat. The patient, who is the second and only other child,
was born July 11, 1893. Labor was not protracted nor severe. Nothing
unusual was noticed until the second day after birth, when it was found
that the right femur was fractured, and, on further examination under
an anæsthetic, the left femur was also found to be broken in its neck.
Both limbs were placed in long splints and dressed with a silicate of
soda bandage. In three weeks the dressings were removed and union
was found complete. On September 11th, at the age of three months,
the right humerus and right femur were broken. The accident appears
to have been the result of a medical examination, since the boy cried
as though in pain while it was going on. As the examination was made
with due gentleness this shows the exceeding brittleness of the bones.
Both bones united nicely. On March 1, 1894, he was sitting in his
chair, lost his balance and fell forward, but not out of the chair, pro-
ducing a fracture of the right femur near the hip. On September 11,

1894, just a year after the former accident, he broke his left thigh again. Union took place, but in October, two weeks after the dressings had been removed, the bone was fractured again. This time it was kept in splints four or five weeks. When examined during anæsthesia the femora appeared to be abnormally thin. In the spring of 1895 he fell out of his hammock and broke both his thighs. Union took place well. Three months later he broke his right thigh.

Besides these fractures there were times when he appeared to be having pain in various parts of the body, supposed to be rheumatic, but which was undoubtedly due to undiscovered fractures, since at least one fracture of the left thigh and one of the right forearm, both of which united with angular union, were found afterward. On several occasions he has broken his ribs. It is estimated that he has had in all 17 or 18 fractures, and he certainly has had 12. The fractures have always been attended by pain, but do not appear to have been preceded by it. Union has always been prompt. The child was nursed until the age of five months. After that he was fed with cow's milk and later with nourishment suitable to his age. The general health and nutrition are good. The appetite is good, and there have been but slight digestive disturbances. He is carried constantly upon a stretcher, lest sitting him up should produce fracture.

I saw him for the first time December 3, 1895. Examination was difficult, owing to the great terror which the child had of doctors, and the danger of fracture which handling entailed. He was a plump, apparently well-developed and healthy-looking boy, lying comfortably on his back on a stretcher. The head was decidedly larger than normal. The frontal bones had distinct bosses suggesting rickets, and the back of the head was flattened, doubtless from the long-continued pressure caused by the enforced position. There were no other evidences of possible rickets connected with it. The chest was of normal shape and there was no beading of the ribs. There were no enlargements of the epiphyses of the long bones. The right arm had a bad angular deformity shortly above the wrist, and the left thigh was similarly deformed at the upper third, with eversion of the foot. Curvature of the bones in any part of the body could not be detected. The muscles of the calves were well developed, but the thighs were flabby. The arms were well developed. He had been taking cod-liver oil for some time. I advised that he be carefully accustomed to sit up in order to give his muscles the needed exercise.

I saw him for the second time in April, 1896. He had improved greatly. He could now turn himself over and move his legs freely, and could sit upright in the lap, although he needed support. The muscles were evidently gaining strength rapidly. His general condition was excellent. His head, however, seemed even larger than at the first examination, although not hydrocephalic in appearance nor of rickety shape. It seemed, in fact, simply to be an unusually large head for his size. There had now been no fractures since the preceding summer, and the fragility seemed evidently less. I advised the use of phosphorus in addition to the cod-liver oil, and that he have plenty of fresh air and all the exercise he could be made to take with safety to his limbs. I could not obtain a specimen of urine.

I have looked somewhat extensively through medical literature in search of cases of idiopathic osteopsathyrosis in childhood, in the effort

to learn what light the experience of others might throw upon the cause, nature, and treatment of this strange affection.   There have been but few cases reported with a degree of brittleness greater than, or even as great as, that shown by the case just detailed; and even instances with a less, although still decided, brittleness, with the occurrence of multiple fractures, have not been common.   The list which follows is the result of the search.   Cases have been excluded in which the disease appeared to have commenced after puberty, and most of those also in which but one or two bones were fractured apparently from slight causes.   Those cases, too, have been omitted in which it seemed certain from the other symptoms or from the post-mortem examination that the undoubted fragility was secondary to some other disease.   Instances of multiple intrauterine fracture, in which it seemed likely that accidents happening during pregnancy were sufficient to account for the lesions, have also been rejected.   On the other hand, a number of doubtful cases have been included, although with explanatory remarks to indicate the uncertainty.   The observations are not arranged in any alphabetical or chronological order.

A. CASES SHOWING DIRECT INHERITANCE.

The influence of inheritance has been very marked in a number of instances, the disease having appeared in the parents or grandparents, and perhaps affecting several children of the family.   The following cases represent this direct inheritance :

I. Greenish (*Brit. Med. Journ.*, 1880, i. 967).   In a family the grandfather, A., had been an invalid on account of multiple fractures.   He had three sons and two daughters.   The daughters and one son had no fractures, but of the remaining two sons one, B., had suffered 1 fracture, and of his children one son had 13 fractures by the age of nineteen years, the first break occurring when very young.   Most of the fractures healed promptly, but some were very slow.   Another son had 2 fractures, the result of a severe accident.   One other son and two daughters escaped accident.   A.'s other son, C., had 2 fractures, and of his children one son had 8 fractures, one son 3, three sons each 4, and one daughter 3 fractures.   Four other daughters escaped accident.   The cause of the fractures was usually slight.

II. Pauli (*Unters. u. Erfahrung. im Gebiete der Chir.*, 1844, 35. Quoted in *Dublin Hosp. Gaz.*, February 1, 1846, 189).   The members of a family otherwise healthy had all had fractures; three of them had 2 each, one 3, and one 5 fractures.   No considerable violence was required.   No fracture occurred before the age of eight years.   All healed with unusual rapidity.   A second break never took place in the seat of a former one.   Both the father and grandfather had been liable to fractures.

III. Willard (*Med. News*, 1887, ii. 734).   The father and mother showed no evidence of syphilis and denied having had it.   The children were small, puny, and had notched teeth, and some were almost dwarfs.

The father had 3 fractures, all from direct violence. One daughter, eighteen years old, had 9 fractures by the age of twelve years, the first occurring at twelve months. One daughter had 5 fractures by the age of sixteen years, the first at four years. One daughter, aged eighteen years, had 3 fractures by the age of twenty-two months, but none since. The first was at eight weeks. One son had 4 fractures by the age of eight years, the first being at two years. One daughter fractured her left clavicle at birth, during an easy labor, and fractured it again at thirteen months. One daughter fractured her right clavicle at the age of one week. One daughter fractured her left clavicle at the age of three weeeks. One son fractured a rib at seven years of age. A grandchild, the child of one of the affected daughters, broke its thigh at the age of four weeks, and broke it again at nine months.

Nearly always the fractures resulted from some insignificant cause. Union was usually speedy. In the femora the fractures were nearly always in the line of the callus.

In this case the presence of fragility in the father is doubtful, but its inheritance by the grandchild is undoubted.

The following instance of fragility is so interesting on account of the remarkable inheritance that I include it, although there is strong doubt upon the propriety of calling the osteopsathyrosis idiopathic:

IV. Ekmann (*Dissertatio medica descriptionem et casus aliquot osteomalacia sistens.* Upsaliæ, 1788. Quoted by Gurlt, *loc. cit.,* 148). The great-grandfather, A., had limbs so deformed that he could not walk. In the next generation one son, B.$_1$, lost all strength in the arms and legs at the time of puberty. One daughter, B.$_2$, was small and deformed and waddled. One son, B.$_3$, was a dwarf and had a decided bend of the arms and legs. In the third generation—the children of B.$_3$—there was one son, C., who experienced fractures from the slightest causes from earliest infancy. His limbs were bent and he was unable to walk. In the fourth generation—the children of C.—one son, D.$_1$, when scarcely a month old, had his arms and legs so soft that they bent with the slightest touch, and later fractured three or four times in every year of his childhood. One daughter, D.$_2$, had a fracture when eight days old, without the action of any discoverable force, and later, during childhood, suffered fractures from the slightest causes.

It would seem that the ancestor of this family was deformed, but whether from bending or breaking is not stated. The next generation showed softening of bone apparently without fracture. The next showed remarkable fragility which seemed far to exceed the softening. The last generation exhibited great softening with fragility in one case, and seemingly fragility alone in the other.

V. Goddard (personal communication to Gibson. *Instit. and Pract. of Surgery,* 1850, 8th ed., i. 236). A boy of thirteen years had 14 fractures, all from very slight causes, and all healing promptly. Four of them occurred by the age of four years. His mother had had 6 fractures and her brother 13 (11 in thighs and 2 in arms) up to the age of thirteen years.

VI. Hamilton (case reported by Armenag Assadoorian). (*Physician and Pharmacist*, February, 1870.)   A man of fifty-three years broke the left elbow when a child, and two years later the right elbow.   No union took place.   Some time later he broke the left clavicle.   In all he had 11 fractures and 2 dislocations.   With regard to one accident it is stated that union was slow.   His father broke both forearms at the elbow. Two paternal uncles each broke a leg and one of them an arm.   A sister had one fracture, and she or another sister had another.   A brother had 5 fractures and 1 dislocation.

VII. Graham (*Boston Med. and Surg. Journ.*, 1884, cx. 467).   A man [it would seem of thirty-two or thirty-three years of age] had his first fracture at eighteen months.   He continued to have them at frequent intervals, and had in all 18 fractures by the age of eighteen years, but none since.   His father had 14 fractures, and a cousin of his father 21.   The father's paternal uncle also was a bone-breaker.

VIII. Cox (*Eclect. Med. Journ.*, Cincinnati, 1879, xxxix. 458).   A girl of eighteen years had never been able to walk [presumably from early fractures].   Her lower extremities were greatly deformed and she had in all 7 fractures, 5 of them of the femur.   The brother of thirteen years had never been able to walk [but it is not stated whether there had been fractures].   The father and several of his brothers had bones easily broken.

IX. Hiester (*Boston Med. and Surg. Journ.*, 1849, xli. 393).   A well-developed girl of sixteen years fractured her leg in going upstairs.   This was her 3d fracture.   [The age when the others occurred is not stated.] Three other children of the family had 8, 7, and 3 fractures, respectively.   The maternal grandfather had 4 or 5 fractures.

X. Battles (personal communication to Gross. *System of Surgery*, 1882, 6th ed., vol. i. 871).   Of eleven children five, all males, had fragility of the bones.   One of them, aged twenty-four years, had 64 fractures ; the next had 34 ; the third child, aged thirteen years, had 30 ; the fourth, aged eleven years, had 10 ; the fifth, aged two years, had 2. All were situated in the thighs, occurred usually from slight causes, and united promptly.   No severe pain was experienced.   The six daughters resembled the father in appearance, but the five sons looked like the mother, through whom the fragility seemed to be inherited ; her father and several of her brothers and sisters had brittleness of the bones.

The following instance is a doubtful one, since the " fractures " may have been but separations of the epiphyses :

XI. Atherton (*Dominion Med. Monthly*, 1894, ii. 1).   A boy of thirteen years fractured his olecranon twice on each side, making 4 fractures in all.   There was a tendency in the family to fractures from slight causes. The paternal grandfather had 3 or 4 fractures, and the paternal grandmother very frequent fractures.   The father had at least 6 fractures, and the paternal uncles had broken their bones.   The patient had two sisters, both of whom escaped.

B. CASES SHOWING A FAMILY PREDISPOSITION.

There are other cases than those detailed in which no direct inheritance is reported, yet in which there is a striking family history, more than one child being the subject of the disease, or perhaps other relatives

suffering from it. The cases of this nature which I have been able to find are as follows:

XII. Pritchard (*Lancet*, 1883, ii. 394). A male child, apparently healthy, fractured both humerus and femur without history of accident two days after birth; on the next day broke the other humerus through being moved in bed; and in three weeks broke the other femur. All united promptly. The father was one of eight children, two of whom had fractures in infancy. The only brother of the father had four children, three of whom had fractures apparently spontaneously soon after birth.

The case reported by Pritchard shows a remarkable degree of indirect inheritance. It is not stated that the fathers themselves suffered fractures.

XIII. Axmann (*Ann. f. d. ges. Heilk.*, 1831, iv. 58. Quoted by Gurlt, *loc. cit.*, 149). The writer gives his own family history. He and his two brothers were of rather delicate build. He had a fracture of the leg in his third year; one brother had 4 fractures from the age of two to that of nineteen years, 3 of them occurring before six years of age. The other brother had 9 fractures from the age of two to that of nineteen years, 4 of them before he was five years old. These 14 fractures occurred without the action of noteworthy force. All healed in four or five weeks. The fragility decreased with growth and disappeared at maturity.

This case is doubtless the same as that referred to by Lobstein (*loc. cit.*) and reported by Strack (*Neues Journ. d. pract. Arzneyk. u. Wundarzneyk.*, 1806, xxv., 3 St., 163), and, according to Gurlt, is probably the same as that described by Renard (*Versuch ü. die Entstehüng u. Ernährung des Knochen*, Leipzig, 1803). I have not been able to obtain the original. It seems very possibly, too, identical with that reported by Mebes, and presently to be detailed (XVIII.).

XIV. Arnott (*London Med. Gazette*, 1833, xii. 366). A girl of fourteen years, a patient at the Middlesex Hospital, suffered her first fracture at the age of three years, and had in all 31 fractures, viz., thighs 13, legs 10, arms 7, forearm 1. Slight falls, or even turning around suddenly, were sufficient to cause them. Union was always complete and remarkably prompt. A sister of six years had 9 fractures, the first at eight months. The general health of both girls was excellent. Two brothers and one sister were unaffected.

XV. Agnew (*Princip. and Pract. of Surgery*, 1878, vol. i. 918). A child of three years with a fracture of the thigh had broken the same bone the year before. Five other children in the family had each had fractures of some part of the skeleton, two of them each 3 times, and one, an infant of three weeks, having had a rib broken by being turned in the nurse's arms. The author believes that a syphilitic taint in the father was the cause of the fragility. [However, no evidences of the existence of syphilis in the children are mentioned.]

XVI. Moreau (*Contribution a l'étude de la fragilité constitutionelle des os*. Thèse de Paris, 1894). A girl, aged twelve years, broke her leg at

the age of five years, and had 7 fractures within four years and ten months. All but one were in the legs. Her sister, aged nine years, broke her leg at the age of five years, and had 10 fractures within two years and eight months. All but two were in the legs. All the fractures in these two cases were produced by insignificant causes and all healed promptly. The children were apparently healthy, without history of syphilis or rickets. The father died of progressive paralysis. The mother had by her first husband two children unaffected by the disease.

XVII. Jones (*Medical Archives*, St. Louis, 1866, iii. 127). A man of twenty-four years, of excellent general health. At the age of three years he broke both legs as the result of a slight fall. Since then there had been numerous fractures, about 50 in all, chiefly in the lower extremities. The slightest fall would be sufficient to cause them. Little pain attended and union was rapid. Great deformity finally resulted, making the patient unable to walk. A cousin, the niece of his father, had been afflicted in a similar manner, and had numerous fractures.

XVIII. Mebes (*Die Knochenbrüche, etc.*, 1845, 35). This writer states that among other instances of the affection he knows of a family in which three children had broken legs and arms 8 times within five years.

This brief note corresponds so closely in the number of cases and in the age with the account given by Strack (*loc. cit.*) of the early history of the Axmann family (see XIII.), that it seems very possible that the cases are identical.

C. ISOLATED CASES.

There are a considerable number of cases reported in which no history is given of inheritance of the malady or of family predisposition. I have been able to find the following instances :

XIX. Blanchard (*Chicago Med. Journ. and Exam.*, 1876, xxxiii. 7). Later and more completely in *Transac. Amer. Orthop. Assoc.*, 1893, vi. 83). A woman, aged twenty-seven years, experienced her first fracture at the age of two months. Up to the age of nine years, when first reported, she had 41 fractures. At twenty-seven years she was unable to walk and had about 106 fractures. Her own weight was sufficient to break her legs, and she frequently had produced fractures by turning in bed. Not much inflammation or pain attended them and no pain preceded. Union was remarkably tedious, for when dressings were removed at the end of the second or third month the bone was still pliable, and angular bending would begin and continue until more than a year after the accident. Great deformity finally ensued.

XX. Blanchard (case of Frankenthal). (*Transac. Amer. Orthop. Assoc.*, 1895, viii. 275.) A woman of twenty-nine years, who commenced to have fractures in the second year of life. Up to the time when reported she had 17 fractures of the long bones and 2 dislocations. There was but slight pain or inflammation with the accidents. Union was very tedious. At the end of two or three months it was not firmer than rubber, and two or three years passed before it was completely firm. Dressings were usually removed after two or three months, and angular curvature then commenced and increased until the end of one or two years.

XXI. Blanchard (*ibid.*). A girl of four years fractured her right femur when two years old, by falling from a chair. It was neglected, and angular deformity resulted. About six months later she broke her left femur through a very slight fall, and again in six months broke it in another place. Union was prompt and perfect in the last two fractures.

XXII. Fleming (*Edinb. Med. Journ.*, 1862, viii. 24). A man of twenty-four years had his first fracture, the thigh, when eighteen months old, and since then had in all 53 fractures, viz., thighs 35, ribs 8, forearms 5, jaw 1, fingers 4. The simplest causes were sufficient. Union was remarkably prompt in the fracture under observation—the last one.

XXIII. Gibson (*Instit. and Pract. of Surgery*, 1850, 8th ed., vol. i. 234). A man of twenty-two years, previously of excellent health, had extraordinary brittleness of the bones from infancy, and had suffered in all 24 fractures from the slightest causes, such as tripping over a rug, walking, etc. Union was prompt and without much deformity.

XXIV. Velpeau (*Gaz. des Hôpitaux*, 1847, 2 ser., ix. 265). A girl of excellent general health had her first fracture at the age of fourteen months, and before the age of fifteen years had 6 fractures—thigh 5, arm 1. All resulted from very slight causes, twice while merely walking. The last fracture united slowly. She had also had 3 dislocations.

XXV. Earle (quoted by Stanley, *Diseases of the Bones*, 1849, 195). A boy of ten years had 8 fractures—6 in one tibia and 2 in one femur —each in a different part of the bone from the preceding ones. All united within the usual time.

XXVI. Mettauer (personal communication to Gibson, *Institutes and Practice of Surgery*, 1850, 8th ed., vol. i. 235). A man of seventy years had been subject to fractures from earliest infancy. The tendency to fracture had seemed to increase with age. The slightest cause was sufficient, such as mounting a horse, a sudden twist of the body, etc. Recovery was always astonishingly speedy.

XXVII. Corson (*The Clinic*, Cincinnati, 1873, iv. 157). A well-developed infant cried for five hours after a difficult birth. On the eleventh day a fracture of the thigh was discovered, and nine days later the other thigh was fractured, two days later still the humerus broke, and at this time callus was discovered on the radius and ulna.

XXVIII. Langton (*Brit. Med. Journ.*, 1895, ii. 1234). A girl had been by the age of eleven years the subject of several spontaneous fractures as the result of muscular action or very slight injury. All united but one, which had been roughly treated. In this one union was never firm. Subsequently two fractures which had been firm parted again, and in one of them a sarcoma developed by the age of twenty-three years.

XXIX. Houston (*Dublin Journ. Med. and Chem. Sciences*, 1836, viii. 474). A well-developed boy of five years had his first fracture at three years. Within two years he broke each tibia and each femur once. The cause was always inconsiderable, and the fractures always occurred while running. Union was always prompt.

XXX. Schultze (*Arch. f. klin. Chirurg.*, 1894, xlvii. 327). A girl, thirteen years old, was weak when born, but later grew well and strong. She had her first fracture, the right femur, at nine months. At one and a half years of age the same place broke again. Up to six years of age she had 5 more fractures without any trace of bending, and by her

thirteenth year she had not less than 30, viz., right thigh 7, left thigh 5, right leg 6, left leg 4, right arm 2, left arm 4, right forearm 2. All were produced by the slightest causes. Pain was nearly absent in fractures of the upper extremity, but present in those of the lower. Union took place in a shorter time than in normal bone. Great bending and twisting of the lower extremities finally developed. Operation showed the tibiæ to be much flattened, and with the marrow-cavity of the right tibia scarcely visible and no trace of it in the left. The right tibia and fibula were united by a flattened exostosis.

XXXI. Linck (*Archiv f. Gynäkol.*, 1887, xxx. 264). No history of accident to or disease of the mother. Labor was easy. A premature child which died shortly after birth. There were fresh fractures and old healed and unhealed fractures of all the ribs—40 on the left side and 44 on the right—which had caused numerous nodules and bendings ; 10 fractures of the extremities—6 of them fresh—and united and recent fractures of the clavicles. No enlargement of the epiphyses or of the junction of the ribs and cartilages was anywhere found. The microscopical examination showed the bones to be practically normal.

XXXII. Parker (*New York Med. Journ.*, 1852, n. s., ix. 96). A girl of eleven years, previously in poor health, had her first fracture—of the tibia—at the age of six years. Five months later she broke her right thigh, and when about ten years old her clavicle. The cause was always insignificant, and union was always prompt.

XXXIII. Howell (*Atlanta Med. and Surg. Journ.*, 1884, xxv. 82). A healthy man of twenty-eight years had his first fracture—the left thigh—in his second year, through falling from a chair. A few years later he broke the right thigh. By the age of twelve years he had broken his right thigh 3 times and his left thigh 2 times, and a year or two later he broke his left thigh again. The 7th fracture was of the right thigh in his sixteenth year, and the last fracture was of the left thigh at twenty-eight years. The last united slowly.

The following cases are even more briefly described by those reporting them than are some of the last :

XXXIV. Tamplin (*Lectures on the Nature and Treatment of Deformities*, 1846, 234). A girl of seventeen years, of unhealthy appearance and pallid, had about 40 fractures produced by walking or other slight cause. [The age when the disease began is not stated.]

XXXV. Dawson. According to Corson (*The Clinic*, Cincinnati, 1873, iv. 157), W. W. Dawson "presented at one of his clinics" a child of three years who had suffered more than a score of fractures. The readiness with which the bones united was one of the most prominent features.

XXXVI. Willett (*Brit. Med. Journ.*, 1895, ii. 1235) states that he remembered a child who had broken 6 of its long bones, only one of the fractures showing any signs of callus.

XXXVII. Ridd (*Schmidt's Jahrbücher*, Jahrg., 1868, Bd. ii. 631). [This is the reference given by Linck, but I have not succeeded in verifying it, and there seems to be some mistake in it.] A healthy mother had a premature child which lived nine days and died suddenly in a convulsion. The autopsy revealed 54 fractures, partly recent, partly united by callus.

XXXVIII. Ketch (*Trans. Amer. Orthop. Assoc.*, 1893, vi. 86) saw a child some years ago in a public clinic in New York who would have a fracture on turning in bed. [I have been unable to learn anything further about this case.]

XXXIX. Hoadley (*Trans. Amer. Orthop. Assoc.*, 1893, vi 85) says that Bond showed a case of fragilitas twenty years ago in the Chicago Medical College. The child [sex not stated] was about twelve years old, and there had been about 119 fractures. The bones are said to have been soft in the earlier stages. The fractures united with great facility. [I have been unable to discover where the case was first reported.]

XL. D'Outrepont (*Abhandlungen u. Beiträge geburtshülflichen Inhalts.* Th. 1, Bamberg u. Würzburg, 1822, 228; quoted by Gurlt, *loc. cit.*, 225). A stillborn child exhibited signs of fracture of the right thigh, both upper arms, and the left clavicle. Callus, which seemed probably to be recently formed, was found on the bones at the autopsy.

XLI. D'Outrepont (*ibid.*, 233; quoted by Gurlt, *ibid.*, 225). A child, after an easy labor, was found to have fractures of the left femur, right humerus, right clavicle, and two ribs. No cause was discovered. The child recovered.

XLII. Wight (*Annals of Surgery*, 1893, xviii. 662). A boy of eighteen years had great deformity of the legs and thighs from angular union of fractures. The father stated that his son had always been subject to poor health, and that he had had fits, and that this was the cause of the crooked bones. [Apparently the deformity was the result of frequent fractures of the fragile bones caused by muscular action during the fits. The age when the convulsions began is not stated.]

D. ISOLATED CASES WITH SOME ELEMENT OF DOUBT.

The following instances of the disease, occurring in a single individual of a family, have some element of doubt attached to them as regards their belonging strictly to the class of idiopathic osteopsathyrosis. In some of them the writer mentions the existence of rickets, although it is not convincing in every instance that this disease had been present; for the old writers, and many more recent ones as well, were disposed to attribute all cases of early fragilitas to rickets as a matter of course. In other cases rickets certainly had existed at one time, but the fragilitas showed itself at a period when rickets must have ceased to be active. It does not seem at all clear that the two conditions were at all interdependent in these cases.

In other instances we have to do with cases which resembled in some particulars the so-called fœtal rickets, but in which there was a degree of fragility by no means corresponding with that usually seen in this condition. Finally, we have certain intrauterine cases where the fractured or membranous condition of the bones of the cranium, or the very great number of fractures occurring widespread in fœtal life, led to the suspicion that the cause may have been an insufficient advancement of the ossifying process. Such a condition is, however, a very obscure one, and does not satisfactorily explain the fragility. I have, therefore, pro-

visionally included these cases with the others as instances of idiopathic osteopsathyrosis. Although there is a history of accident to the mother during pregnancy mentioned in some instances, it does not seem sufficient in the cases I have selected to account for the fractures.

XLIII. Jacquinelle (*Journ. de Médec., Chirurg., Pharm., etc.,* 1788, lxxvii. 267, and 1790, lxxxiv. 216). A man of thirty-two years undoubtedly had rickets severely as an infant, and could not walk until five years old. He was then fairly well until twelve years old, when he had his first fracture, one of the arm. He had a fracture of both thighs at fifteen years, and one of the arm two years later. In all he had 6 fractures. The degree of force required was inconsiderable. Union was prompt and complete.

XLIV. Lonsdale (*A Practical Treatise on Fractures,* 1838, 21). A girl in whom there had been 22 fractures from the most trivial causes. Most of the bones were rickety. Union took place in the usual time. [The age of the girl is not stated, nor is the evidence of rickets explained. From the context it appears that there was no bending of the bones in this case.]

XLV. Barwell (*Brit. Med. Journ.,* 1882, ii. 1155). A girl of seventeen years, with great bending and deformity of the bones of the extremities, but with no bending of the ribs nor enlargement of the epiphyses. Between the ages of nine and thirteen years she broke her arm 4 times and her ribs on several occasions. He describes the case as rhachitic osteomalacia, stating that it was neither rickets nor osteomalacia. [The late development and the absence of positive signs of rickets make it probable that this is an instance of idiopathic osteopsathyrosis.]

XLVI. Lange (Günsburg's *Zeitsch. f. klin. Medizin,* 1852, iii. 263). A girl of eleven years, of scrofulous habitus and with pigeon breast, had in all 6 fractures. Two years later she had her 7th fracture. [Nothing is said as to the age when the first fracture occurred, nor is there anything to suggest rickets unless it is the pigeon breast.]

XLVII. Esquirol (quoted by Malgaigne, *A Treatise on Fractures,* Amer. ed., 33) had in his collection the skeleton of a rhachitic female in which nearly all the long bones were broken, and more than 200 fractures could be counted. [Nothing is said of the age, but it is safe to presume that with such numerous fractures the disease must have been present in childhood, and that something more than rickets was present.]

XLVIII. Malgaigne (*A Treatise on Fractures,* Amer. ed., 33) says that in the Musée Dupuytren is a skeleton of a child, of six or seven years, with general rhachitis and with 12 fractures.

XLIX. Malgaigne (*ibid.,* 31). A boy of ten years, who had been badly rhachitic in early infancy and whose legs and arms were distorted by the disease. His first fracture occurred at the age of six years, and he had 4 by ten years. No special force was required. All healed well.

L. Chaussier (*Bull. de la Fac. de Méd. de Paris,* 1814, iii. 306). A female child, dying twenty-four hours after an easy labor. The long bones of the extremities were shorter and thicker than normal and more or less curved. There were found 113 complete fractures, some of them united, some still yielding to bending and with crepitation, and with the periosteum in these places much thickened. The ribs alone had 70 fractures.

LI. Barker (*Brit. Med. Journ.*, 1857, ii. 806, 823). A female child, dying ten minutes after birth, which had not been difficult. The mother had repeatedly had falls on a flight of stone steps. The examination of the child showed an entire absence of bone in the covering of the brain, and numerous fractures of both the upper and lower extremities. The bones were remarkably brittle, the merest pressure snapping the ribs like glass. Chemical examination of the bones showed too small a proportion of inorganic material—33.34 per cent. The writer believes that arrest of development did not account for the fragility, since the fractures were situated where ossification had advanced the most.

LII. Hirschfeld (*Gaz. des Hôpitaux*, 1857, 291). A seven months' male fœtus, born dead. The mother had had a fall. The fœtus showed no evidence of rickets. The vault of the skull seemed made only of minute thin plates of bone. The long bones of the extremities, the ribs, and the clavicles exhibited a number of fractures, certainly over 20.

LIII. Vrolik (*Tabulæ ad illustrandam embryogenesin hominis et mammalium*, 1849, Fol. Tab. 91, Fig. 1, 2 ; quoted by Linck, *loc. cit.*). A child which died three days after birth. The parents had been syphilitic, but the mother bore an entirely healthy child the next year. The skull was hydrocephalic, and, when skeletonized, was found to consist largely of a great number of irregular pieces of bone, suggesting Wormian bones. The extremities and the ribs exhibited numerous fractures, some fresh, some united by callus.

LIV. Dupuytren (*Bull. de la Fac. de Méd. de Paris*, 1811, ii. 154.) A little girl, very delicate, and with a weakly mother. At the age of two months she had her first fracture—the arm—without known cause, and two months later she broke the left thigh while lying down. At eight months of age she broke the right thigh. This last was preceded by a curvature of the limb. At two years and four months the right thigh appeared to be giving way, and after some days it broke as the result of a fall. Then the earlier of the old fractures softened and the bones became bent.

LV. Dubrueil (*Étude critique sur les fractures spontanées*, Paris, 1891). A boy of ten years, of a healthy father but rhachitic mother, had his legs bent in infancy by rhachitis. He suffered his first fracture—the humerus—at six years, and had 4 fractures by the age of ten years. The cause was slight in all ; there was not much pain, and union was not delayed.

LVI. Cecconi (*Giornale dell. soc med. chir. di Parma ;* quoted in Hufeland's *Journ. der pract. Arzneyk*, 1816, xlii. St. 4, 124). A child dying seven hours after an easy birth. All the epiphyses had been broken " in the direction of their length." The shoulder-blades were the only ones spared. Crepitation could be heard and felt. No history of accident to the mother. [It is not clear from the description whether or not this is an instance of separation of epiphyses, but it would seem not. I have not been able to obtain the Italian original.]

LVII. Schroeder (*Medizin. Zeitung d. Verein f. Heilk. in Pr.*, 1843, 136). A girl of five years, of rhachitic constitution and the subject of a tapeworm, broke both thighs in an attack of convulsions. She had had the same accident three times in the two preceding years.

LVIII. Volckamer (*Miscellanea curiosa med.-phys.* Acad. N. C., Dec. 1. Ann. 2, 1671, Obs. 225, p. 327 ; quoted by Gurlt, *loc. cit.*, 230). A boy of ten years, the subject of epilepsy since three years old. A

few months before death he broke his tibia and humerus in a violent convulsion, and shortly after this experienced more fractures. The autopsy showed still more fractures that had not been recognized.

In these last two cases the fractures were evidently the result of violent muscular contraction, but there must probably have existed fragility as well.

Chaussier (*loc. cit.*) quotes certain cases of intrauterine fractures cited by older writers which seem to be instances of remarkable fragility ; but whether these were due to true osteopsathyrosis or to some lack of development cannot be surmised from this nature of the reports. Moreover, as he remarks, there is reason to doubt their existence, since the reports are founded largely upon hearsay. The cases are those of Malbranche, Hartzoeker, and Muys, as follows :

LIX. Malbranche (*Traité de la recherche de la vérité*, liv. 2, chap. 7). A young man, an imbecile, whose body was broken in the same places in which the bones of criminals are broken. He had lived more than twenty years in this state. Material impression, from seeing the punishment of criminals on the wheel, was assigned as the case.

LX. Hartzoeker (*suite des Conjectures Physiques*, Amsterdam, 1708). A woman who lived to the age of thirty-two or three years, always confined to bed, with her bones everywhere broken as in the case of criminals. Assigned to maternal impression, as in the last cause.

LXI. Muys (in the preface to *De museulorum artificiosa fabrica*, 1751). A child was born at term to a woman who had seen an execution upon the wheel. The child had all its members broken like those of a thief.

LXII. Notta (*Bull. Soc. Anat. de Paris*, 1849, xxiv. 83). A male child of a healthy mother. The head at birth was remarkably soft and could be compressed like a vessel of water. The child died soon after birth. The autopsy showed ossification but little advanced, and much of the bone of the skull made of numbers of small irregularly shaped pieces about 1 cm. in diameter, and separated from each other by membranous tissue. The bones of the trunk were normal. The tibiæ, femora, and bones of the left forearm were somewhat curved, and the ends of the radii swollen. The bones of the extremities presented 15 fractures, 12 of which were recent, 2 consolidated, and 1 uniting.

LXIII. Harvey (*Med. Herald*, St. Joseph, 1891, x. 255). A boy in whom at birth the whole vault of the cranium was nearly without support or protection. There were double bowleg and anterior curvature [which may have been the result of intrauterine fractures]. When three days old he broke the left arm, and by the age of two and a half months he had 8 fractures. Severe falls had accounted for some of them. [For the others the cause is not stated.] Crepitus was very evident in all fractures. The child grew well and looked well.

LXIV. Schmidt (*Monatssch. f. Geburtsk. u. Frauenkr.*, 1859, xiv. 426). A weakly child of healthy parents, died shortly after an easy birth. All the bones seemed to crepitate when the body was handled, and each seemed entirely broken in two or three places. The head felt like a broken egg. The autopsy showed the bones of the lower extremities three or four times broken ; some of the fractures already united, some with slight callus, and some with none. The bones of the head were

composed of numerous small bony plates.   Microscopic examination by E. Wagner led to the conclusion that the condition was a congenital non-syphilitic atrophy of the entire skeleton, best described as a chronic parenchymatous osteitis; quite different from osteomalacia or rhachitis or the ordinary osteitis.

LXV. Baudelocque (case described by Marc in *Dict de Sci. Méd.*, 1816, xvi. 64). Labor was rapid and easy, and there had been no violence done to the child, which died a few days after birth. The autopsy showed 43 fractures of the long bones, including most of the ribs. Even some of the cranial bones were broken. Some of the fractures were consolidated and others were in process of union.

This is the same as a case reported by Chaussier (Proces verbal, etc. —see *loc. cit.*, 306).

LXVI. Amand (*Nouveau obs. sur. la. prat. des acc.*, p. 92, obs. viii. Quoted in *Dict. des Dict. de la Méd. Française et Étranger*, 1840, iii. 219). A fœtus of four or five months. The bones were separate and movable in the middle of the forearms, thighs, and legs, and seemed joined only by the skin.

LVII. Griffith (case now reported).

A short review of the affection based upon these reported cases is in place here.

ETIOLOGY. As the name idiopathic implies, we find that the histories of the cases collected throw little light upon the cause of the disease. The influence of *heredity* is the only point which strikes us forcibly, inasmuch as direct inheritance, or at least a family tendency, was shown in 18 of the 67 reports. This influence of inheritance is so marked that Gurlt has compared the affection to hæmophilia and Moreau to progressive muscular dystrophy. There is a distinct difference in the line of inheritance, the influence of the male greatly predominating. We notice, namely, that in the 11 families in which direct inheritance (from parent or grandparent) obtained the disease was transmitted in 7 instances from the father, and often from the grandfather as well, and that in 2 more instances, Heister's and Battle's, it descended through an unaffected mother from an affected grandfather. Of the 2 remaining families, in 1, Willard's, the disease appears to have been transmitted from the father, and was certainly so from one of his affected daughters to her children, while in the other, Goddard's, it was the mother who was subject to fractures. In Atherton's case, although the transmission was predominantly by the males, the grandmother as well as the grandfather was subject to fractures.

In the matter of the etiological influence of *sex*, the accounts are not sufficiently accurate to allow of any reliable figures being given, since in many cases the sex of the children is not stated. It is noticeable that of all the cases, young and old, occurring in the family connection of the 18 observations where inheritance or family tendency to the dis-

ease was marked—if we leave out the instances reported by Ekmann as too anomalous—at least 47 were males and but about 19 females, with 24 whose sex is not mentioned. This shows a tendency to a transmission not only through males but to males. Of the total number of cases developing in childhood here reported there are, as nearly as can be counted, 41 males and 32 females; but there are so many others whose sex is not stated that no conclusion can properly be drawn.

As to the *age*, there is a decided tendency for the affection to begin early in life. There are a number of cases reported which began later, yet the abstracts here given, although limited to the disease as seen in childhood, still contain a large proportion of the instances of idiopathic osteopsathyrosis reported for all periods of life. The list does not, of course, contain instances of the secondary forms, which include the atrophic fragilitas of old age. Details are not complete enough to allow of more than general statements, but we find that in many instances fractures occurred before birth, in still more they appeared a little later, and in a few the fragility developed only as growth advanced, notably in the cases of Pauli.

It is worthy of note that the amount of *force* required to produce fractures was nearly always very slight, and sometimes remarkably so. Among the causes mentioned are going upstairs, leaning over, turning around, being moved in bed, tripping, turning in bed, the slightest fall, and the like. In Blanchard's first case the mere weight of the body was sufficient to break the legs, and in my own case the thighs were fractured on one occasion by the child falling forward while in a sitting position.

The influence of *other diseases* in producing idiopathic osteopsathyrosis is problematical. In some cases the children have been weakly, but as a rule this was not the case. The influence of syphilis seems to have been practically negative in the cases I have collected. Were it otherwise they would not be included in the category of an idiopathic condition. The mere fact that a parent was, or was supposed to be, syphilitic is not sufficient to explain the strange fragility. I have, as stated already, excluded from this list those cases in which it seemed reasonable to believe that the tendency to fracture might be the result of the presence of multiple gummata of the bones. So, also, there seems to be no good reason to attribute a special fragility to the coexistence or previous existence of rickets. Rickets is an extremely common disease, yet fragilitas, such as the abstracts exemplify, is rare. Then, too, fragilitas so often appears at an age when rickets has not yet developed, or sometimes comes on when rickets has ceased to be active. It has been claimed that a previous rickets produces later a condition of fragilitas, but this is an assumption for which I have been unable to find any adequate proof.

PATHOLOGY AND PATHOLOGICAL ANATOMY. This is, if possible, even less understood than is its etiology. The relationship of osteopsathyrosis to osteomalacia and to rhachitis is a question which forces itself upon us. It is evident that the process differs entirely from osteomalacia. In this latter affection there is an increasing softness of bone with a remarkable tendency to bending and to absorption of inorganic material. Fractures, if they occur, are purely of a secondary nature, for the prime factor is the softening. The family reported by Ekmann is a pointed instance of a combination of osteomalacia and osteopsathyrosis, or, rather, of the appearance of the two diseases singly or combined in different members of the same family. It is not a proof of their unity.

Rhachitis is much more closely allied to osteomalacia than to osteopsathyrosis. There is in children a natural tendency to infraction of bone—i. e., to the occurrence of green-stick fractures; and in rhachitis this tendency is greatly exaggerated. In osteopsathyrosis, on the other hand, just the reverse of this is seen, and the condition is one of extreme brittleness without disposition to bend. Rhachitis, as has already been pointed out, sometimes causes true fractures, but far oftener does not. When, therefore, we find an excessive degree of fragility in a case of rickets it is rather an evidence that rickets and osteopsathyrosis may be combined in the same individual—not a proof that they are at all identical or even necessarily related. It must, too, be borne in mind constantly that in many cases in which curvature of the limbs is spoken of the condition may very possibly have been the result of fracture and not of bending.

Cases of so-called fœtal rickets have repeatedly been described. The pathological position of this condition is not certain. Orth (*Path. Anat. Diagnost.*, 1894, 681) claims that it has nothing whatever to do with rickets. Some of the reported cases exhibit a remarkable softness of the skull, with great fragility of the bones of the extremities, yet without any of the characteristic symptoms of rickets. Cases of this nature I have provisionally placed in the category of osteopsathyrosis, since they seem to belong there better than elsewhere.

But few chemical and microscopical examinations of the bones have been possible, and these have made the matter but little clearer. In the case reported by Linck the microscopical examination showed that the calcification of the projecting portions (the callus) at the seat of fracture was not perfectly developed, but that the bone elsewhere was normal. In Schultze's case excised pieces of tibia showed the marrow cavity nearly obliterated in the right leg and quite so in the left. But as this was at the seat of former fracture, it taught little. The bones in Barker's case, which is one of the possible instances of imperfect ossification, gave on chemical analysis 33.34 per cent. of inorganic matter, and 66.66 per cent. of organic matter, thus showing a great deficiency in the amount

of the former.   On the other hand, in a typical case of idiopathic osteo-psathyrosis occurring in an adult and reported by Enderlen (*Archiv f. path. Anat.*, 1893, cxxxi. 223) there was in the portion of femur exam-ined an excess of organic material of only 6.27 per cent.—a figure wholly inconsiderable.   Finally, in the case of Schmidt, which was one of the doubtful cases similar to that of Barker, the microscopical exam-ination indicated the presence of a chronic parenchymatous osteitis, which Wagner called a " non-syphilitic atrophy."   These are all the examinations which have been made among the cases collected here. As may be noticed, they are contradictory; and, if we leave out the doubtful cases and take only the more typical ones of Linck and Schultze, and the adult case of Enderlen, we find no change present which accounts in the slightest degree for the fragility.

Gurlt suggests that a certain compactness in the bone, rather than any alteration in the chemical composition, explains the fragility, and Ziegler, as quoted by Schultze, suggests some pathological alteration of the basis of the bony framework.   Moreau believes that there is some nervous basis for the disease, and that a lesion of the anterior horns of the spinal cord is the most probable cause.

Verneuil (Virchow-Hirsch, *Jahresbericht, etc.*, 1885, ii. 317) examined the urine in three cases of spontaneous fracture, and found it remarkably rich in phosphatic salts, and Blanchard reported a large amount of earthy phosphates in the urine of his first patient.   It is possible that this may have some bearing upon the pathology of the disease, but fur-ther studies are needed.

An interesting feature of the affection is that in nearly all cases union of the broken bones was prompt, and generally remarkably so.   Some-times the fragments united so readily that, as in Mettauer's case and in the one which I had under observation, professional advice was not even sought for.   This rapidity of union has been pointed out by many writers.   The most noteworthy exceptions which I have discovered were Blanchard's first and second cases, where union was extremely tedious. Some of the fractures in Velpeau's, Hamilton's, Howell's, and one of Greenish's cases united slowly, and some remained ununited in the cases of Langton, Hamilton, and possibly Willett.

With regard, again, to the cases of very numerous intrauterine frac-tures, and especially those with soft and crepitating cranii, for whose origin the assumption of an imperfect ossification has been made, it is to be remarked that autopsies show some of the fractures already united and some with callus present.   This seems to indicate that actual frac-tures had taken place, and not that we had to do merely with numerous small separate centres of ossification which had not yet run together.

SYMPTOMS.   The symptoms consist, of course, in the occurrence of numerous fractures from insignificant causes.   As a rule, the accidents

are painful as in fractures in any other condition. In a few cases, however, it is stated that pain was slight. This was noticed, for instance, in the reports by Battles, Jones, Schultze, Dubrueil, and Blanchard (first and second cases). Pain preceding a break, such as may occur in osteomalacia, is entirely foreign to osteopsathyrosis. As to the bones most frequently affected, it is noticeable that the long bones of the extremities, as well as the clavicles and ribs, are those oftenest broken, and that fractures are especially frequent in the lower extremities. This last is doubtless due merely to the greater strain put upon them. In no case is a fracture of a vertebra or of the pelvis distinctly mentioned, although possibly present in some of the cases of very numerous intrauterine fractures. The position of fracture is entirely independent of the relation of diaphysis and epiphysis. In very few instances was there even the supposition that the condition might consist in the separation of the epiphysis.

When refracture occurred it sometimes happened, as, for instance, in the patients of Willard and Schultze, that the seat of old fractures was the position of new ones. But oftener the bones seem to have broken irrespective of the position of former injury, and in the cases of at least two observers, Earle and Pauli, it is expressly stated that the seat of the old accident did not again fracture. In a few instances, as in the cases of Dupuytren and Langton, actual softening and yielding of the old callus previous to a new break seem to have taken place, but this was quite exceptional and anomalous, and must rather be called a complication than a symptom of the disease.

DIAGNOSIS. In making a diagnosis we have first to determine the absence of other conditions to which the fragility may be secondary. The exclusion of syphilis and of nervous diseases is of importance. Rhachitis presents so many features apart from the breaking of bones that the diagnosis of this disease offers, as a rule, no difficulty. It is questionable whether true osteomalacia ever occurs at a very early age. It has, it is true, been described, as for instance, by Rehn (*Jahrbuch f. Kinderh.*, 1877, xii. 100), but Senator (Ziemssen's *Handbuch der spec. Path. u. Therap.*, 1875, xiii. I. 95) denies the existence of the disease in infancy; and it seems probable that Ziegler (*Lehrbuch d. path. Anat.*, 5 Aufl., ii. 123) is right in considering the reported cases to be really instances of rickets. At the least it can be said that osteomalacia would resemble rickets much more closely than it would osteopsathyrosis.

The absence of local lesions, such as osteitis, caries, tuberculous disease of bone, tumors of bone, etc., is also to be determined.

PROGNOSIS. The prognosis is, as a rule, very unfavorable. The duration of life does not seem to be materially affected by the disease, but the tendency to fracture, once established, is apt to continue unabated. In Mettauer's patient it seemed even to increase with years. The

amount of crippling in bad cases may be very extreme. This was the condition, for instance, in Blanchard's first patient. We may, however, always base a hope of improvement on the fact that a certain number of cases have distinctly outgrown the disposition to fracture. This was notably so in the cases of Axmann and of Graham, where the fragility disappeared by maturity. Some of the children reported by Willard also outgrew the tendency to fracture.

TREATMENT. In such a disease as this, in which both the cause and the nature are so little known, it is evident that the treatment can be but experimental. The administration of alteratives of various sorts, the maintenance of the best general health, and the protection of the limbs against fractures are the indications most apparent, with the hope that as time passes the fragility may be outgrown. Still, while guarding against injury, we must at the same time see that the muscles do not waste. It is likely that a proper lack of muscular support to the limbs may itself increase the tendency to fracture. It is important in case of fracture to secure union of the fragments in proper position, in order to prevent malposition as far as possible. A number of cases have thus reached adult life with but little deformity ; while others have grown badly misshapen for want of proper care.

THE TREATMENT OF FRACTURE OF THE CLAVICLE BY INCISION AND SUTURE.

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THE clavicle is more frequently broken than any other bone in the body, the radius, perhaps, excepted. The outer portion of the middle third is by far the most common seat of fracture, because this is the smallest and most sharply curved part of the bone, and must therefore yield to violence more readily than any other portion.

Hamilton (*Fractures and Dislocations*, sixth edition, p. 195) writes that of 157 fractures of this bone, exclusive of gunshot-fractures, 127 were in the middle third, and, excluding the partial fractures, the break was always near the outer end of the middle third ; 4 were in the inner third, 17 were in the outer third.

Of 140 cases treated in the New York Hospital (Lent, *New York Journal of Medicine*, vol. 2, p. 159), 3 were near the sternal end, 4 at the junction of the inner and middle thirds, 43 in the middle third, 67 at the junction of the middle and outer thirds, and 23 near the acromial end. Of the 61 cases observed by Hurel ("Les Fractures de la clavicule," *Thèse de Paris*, 1857, p. 48), 44 were of the middle third, and

three-fourths of those were situated at or within half of an inch of its outer end.

Fracture of this bone, like fracture of any other bone, may be partial or complete, single or multiple. Multiple compound and comminuted fractures are rare.

Stimson (*Fractures and Dislocations*, 1883, vol. i. p. 324) had a case of compound fracture of the clavicle under his care in the Bellevue Hospital in 1881.

Hamilton, who had a large experience in fractures, never met with a case of compound fracture, and saw only six cases of comminuted frac tures of this bone. But few cases are recorded in which the bone has been broken in two or more places. The line of fracture may be oblique, transverse, or longitudinal. According to the position of the clavicle and the important structures which are near it, severe compli- cations may accompany and be caused by its fracture.

In the second case reported the subclavius muscle was lacerated and its outer portion pulled up between the fragments, and the subclavian vein was in immediate danger of being injured either by the long, sharp inner edge of the outer fragment or by a piece of bone which had been broken off from the inner fragment and was free in the subclavicular region.

This patient was exposed to the same accident which happened to a case reported in the *Progrès Médical*, 1882, No. 16. The report is as follows: a patient, aged fifty nine years, broke the right clavicle in the middle third by a fall upon the shoulder. A large swelling appeared in the supraclavicular region and extended to the level of the parotid. An incision was made and an enormous quantity of blood escaped; the patient died at once in consequence of the entrance of air into the subclavian vein, which had been lacerated by the fragments. The fracture was very oblique from without inward and backward, and the vein was torn completely across by the outer fragments.

Erichsen (*British Medical Journal*, 1873, vol. i. p. 637) reports a case of supposed compression of the subclavian vein by one of the small fragments of a comminuted fracture of the clavicle. Gangrene of the arm appeared on the second day, amputation was performed, and death followed from pyæmia. While the interference with the circulation during life was attributed to compression of the subclavian vein by the fragment, the autopsy showed no signs of such compression.

Annandale (*British Medical Journal*, 1873, vol. ii. p. 82) cut down upon a simple comminuted fracture to remove a fragment which he feared was pressing upon the subclavian vein and might cause it to ulcerate. The patient died, in consequence, it is said, of associated head- injuries.

Mercier ("Des Complications des Fractures de clavicule," *Thèse de*

Paris, 1881) speaks of a case in which the inner end of the outer frag-
ment in a fracture of the middle third of the clavicle had torn the nerve-
trunks and caused immediate and persistent paralysis.

Barker (*Trans. Clinical Society of London*, 1886, xix. p. 109) reports
the case of a lad, aged twelve years, who was supposed to have received
a fracture of the clavicle while in the uterus. He showed a united frac-
ture, but gave no history of injury. For twelve years it gave him con-
siderable pain and trouble. Barker cut down upon it and found fibrous
union. He wired the fragments, and the lad's recovery was perfect.

Stimson (*Fractures and Dislocations*, 1883, vol. i. p. 331) writes that
injury to the lungs, as evidenced by emphysema, has been recorded in
five cases where this symptom seemed to be demonstrative, and in two
others in which it is much more likely that the emphysema was due to
the introduction of air through a wound of the soft parts. He refers
to a case that was under the care of Velpeau, in which the outer frag-
ment was pushed so far in by the fracturing cause that an enormous
emphysema of the entire trunk ensued, and no fracture of the ribs
could be recognized.

The same authority gives a history of Huguier's case, in which the
clavicle was broken by a fall from a height of twenty feet. When the
patient was examined considerable emphysema was found to occupy all
of the left side of the chest in front and behind, yet there was no frac-
ture of the ribs and no external wound. There was hæmoptysis the
following day.

During the summer of 1896, at the clinic in the Jefferson Medical
College Hospital, I assisted Dr. W. Joseph Hearn in two operations
upon fractured clavicles. The cases were as follows:

CASE I.—P. F., a Cuban, aged twenty-five years, was admitted to
the accident-room of the Jefferson Hospital, June 16, 1896. He
fell from a bicycle while in motion, striking upon the palm of his
left hand while the arm was in extension, thus receiving an indirect,
simple complete transverse fracture at the outer end of the middle third
of the left clavicle. The displacements of the fragments were of such
a character and extent that there was no difficulty in recognizing them.
The outer end of the inner fragment was very prominent and almost
through the skin. The inner end of the outer fragment seemed to be
wedged against the inner fragment. Keeping the shoulder upward,
outward, and backward with the Velpeau dressing not only failed to
keep the fragments in apposition, but caused intense pain. The Desault
apparatus failed to maintain reduction. The pressure of the figure-of-
eight bandage would have converted the simple fracture into a com-
pound fracture by the pressure on the already almost protruding outer
end of the inner fragment. The recumbent position was the most satis-
factory. The patient preferred to undergo an operation rather than lie
on his back for three weeks during the hot month of June. When he
was placed on the operating-table with a sand-bag between the shoul-
ders, the outer fragment was forced upward and backward and was a

trifle higher than the inner fragment. Dr. Hearn thought it best to begin the incision over the tissues where the depression was most marked and follow the direction to which the outer fragment pointed while the patient was in the upright position—namely, downward and inward.

Fig. 1.
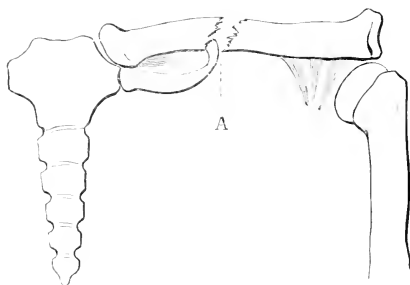
The position of the fragments as seen when exposed, the patient being in the recumbent position with a sand-bag between the shoulders.
A, subclavian muscle.

Accordingly a curvilinear incision was made, the margin of the wound retracted, and the fragments exposed. The bone-ends were tooth-shaped and had between them the outer extremity of the subclavius muscle, which was slightly lacerated. This muscle was pushed from between the fragments; the outer fragment was held up by a broad, periosteal elevator, which was placed beneath it and was kept there until a hole

Fig. 2.
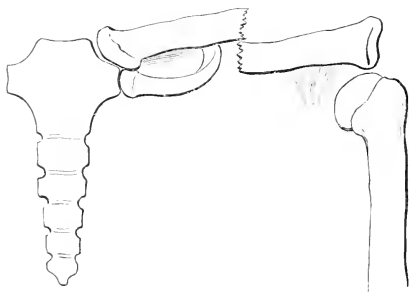
The position of the fragments, the patient being in the upright position.

was drilled through from the anterior to the posterior surface. The inner fragment was treated in the same manner. Through these holes, which were a quarter of an inch from the fractured ends, a silver wire was passed and twisted twice from right to left, then hammered down.

The periosteal elevator not only acts well in supporting the fragments, but it serves as a guard in preventing the drill from suddenly breaking through the bone and injuring the important structures beneath. The handle of a tablespoon may be used, as it is wider than the elevator and will answer the purpose equally well if not better. After the fragments were brought together the periosteum was sutured with fine cat-gut and the external wound was closed with silkworm-gut. The arm was dressed in the Velpeau position, with a light plaster-of-Paris dressing. His highest temperature was 99° F., which was on the night of the operation; the next day it dropped to normal and so remained. In three weeks bony union had taken place, and he had no shortening or discomfort except a little pricking sensation, caused probably by the wire. Fig. 1 shows the position of the fragments and the subclavius muscle. Fig. 2 shows the position of the fragments with the patient

FIG. 3.

standing. Fig. 3 is from a photograph taken three weeks after the operation. It can be seen that both clavicles are very prominent and the deformity is slight. The conical shaped nodule on the left clavicle is caused by the ends of the silver wire, which seem to have risen from the bone, as they can be felt by passing the finger over the clavicle.

CASE II.—P. D., aged twenty-five years, was received in the accident-room of the hospital July 5, 1896. While on a freight-car, which was in motion, he fell off, striking the ground with the point of his left shoulder, causing a simple, complete comminuted fracture at the junction of the middle and outer thirds. The displacement of the inner fragment was marked and the pain was severe. His appearance was quite characteristic; he sat with his body and head inclined toward the injured side and supported the elbow of the injured side with the hand of the sound side. A small spiculum of loose bone could be felt, which was under the skin and over the depression caused by the falling of the outer fragment inward, forward, and downward. The inner end of the outer fragment could not be located, and Dr. Hearn, thinking it might injure some of the important neighboring structures, decided to

operate. On July 7, 1896, an incision three inches in length was carried directly to the bone and in the direction of its long axis. By exposing the part our attention was first directed to a piece of thin bone, which had been broken off from the posterior inferior surface of the inner fragment and was free in the wound. It was shaped like a right-angled triangle; the hypothenuse measured one-half inch; the base and perpendicular each measured about three-eighths of an inch; in thickness it measured one-eighth of an inch. This piece was removed. Another fragment of the bone, which was a little larger than the one just spoken of, was found to be separated from the posterior superior surface of the outer fragment, though attached to it by the periosteum. This piece I replaced and held it in position by throwing a ligature of kangaroo-tendon around the outer fragment, including the detached piece of bone, and tying. In this case, as in the other case, the subclavius muscle was found to be well up between the fragments. The inner end of the outer fragment was long, ragged, and very oblique, and was

Fig. 4.
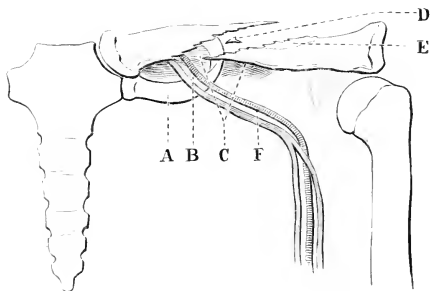
The position of the fragments as seen when exposed, the patient being in the recumbent position.

A, first rib. B, subclavian vessels. C, subclavian muscle. D, loose fragment. E, the loose piece that was attached to the outer fragment by the periosteum. F, axillary vein and artery.

caught in the few remaining fibres of the subclavius muscle, which fortunately kept the sharp end of the bone from coming in contact with the subclavian and axillary vessels. Fresh lacerations of these fibres showed that the fragment was gradually working its way through, and in a short time either direct puncture, pressure, or ulceration of one of the vessels would have ensued. This fragment was brought up and the ragged point cut away, after which both fragments were treated as in Case I. The periosteum was sutured with fine catgut. The skin-wound was closed with Halsted's subcuticular suture and the arm was dressed in the Velpeau position, with a light plaster-of-Paris dressing. His highest temperature was 99° F., which was on the night of the operation. It dropped to normal the next day and remained normal. In three weeks there was good bony union; no pain or deformity. Fig. 4 shows the position the inner end of the outer fragment bears with the third part of the subclavian artery and the first part of the axillary veins, and also the position of the fragments, with the lacerated

subclavius muscle between them.   It also shows the piece of loose bone that was free in the wound, and the dotted lines on the upper part of the outer fragment correspond to the piece of the bone that was found

FIG. 5.

The position of the fragments, the patient being in the upright position.

to be loose, hanging to the outer fragment by the periosteum.   This figure shows the relation of the parts when they were exposed, the patient being in the recumbent position.

FIG. 6.
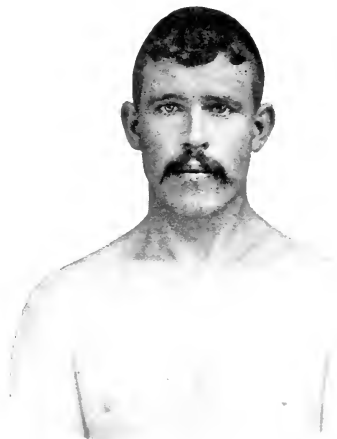
Fig. 5 illustrates the position of the fragments while the patient was standing.   Fig. 6 is from a photograph taken three weeks after the operation.   There is no deformity and the scar from the operation is

slight. Unfortunately during the latter part of the first week following the operation the dressings became disarranged, and the bandage, which was saturated with perspiration, was in contact with the wound from Saturday night until Monday morning, and naturally the wound became infected. Had this not occurred it would take an expert to tell which side had been operated on.

Langenbeck (*Deutsche med. Wochenschrift*, January 28, 1882) had a case in which the fracture was at the junction of the middle and outer thirds. The fragments were united with silver wire. He claims the result good, but says the scar left by the operation would probably be considered as objectionable disfigurement as union with the average displacement. In our cases it was not a question of deformity or scar, but one of safety and comfort. Modern surgery has taught us to fear closed fractures in certain regions more than open fractures. If the first case had not been operated on, as can be seen by Fig. 2, Case I., the subclavius muscle might have delayed if not prevented bony union. If the knife had not converted the fracture into a compound fracture, the outer end of the inner fragment would have done so in a very little while. Indeed, the tissues above this fragment were so thin that it was impossible to find suitable subcuticular tissue for the Halsted subcuticular suture, which will under favorable circumstances prevent a scar. None of the recommended mechanical appliances in the shape of bandages would have freed Case II. from danger. The loose piece of bone and the long, sharp inner end of the outer fragment subjected this man to great risk. By looking at Fig. 4, Case II., it can be seen that the subclavius muscle afforded little protection to the important neighboring structures.

The pathology of the fracture in this case corresponds exactly in regard to the shape and condition of the inner fragment with a case that is reported in the *Progrès Médical*, 1882, No. 16, in which the autopsy showed the vein to be torn completely across by the inner end of the outer fragment. Whatever may be the seat of the fracture which occupies the body of the clavicle, and whatever may be the cause, experience has taught us that with the bandaging system fractures of this bone seldom get well without a callus, which is apparent and is sometimes unsightly. The difficulty with which fractures of this bone are treated is demonstrated by the great number of appliances that have been recommended. A treatise on fractures by Despre states that the prize founded by Boyer and offered for the discovery of an apparatus capable of preventing the deformity consecutive to fractures of the clavicle has not yet been won. In the outpatient surgical department of the Jefferson Hospital Da Costa has had excellent results in treating fractures of this bone, where the deformity was slight, by the application of the Velpeau or the figure-of-eight bandage, and not a few cases

were treated by simply ordering a triangular sling to be worn for three weeks. The recumbent position with a pad between the shoulders and a small sand-bag over the prominent fragment acts admirably in the majority of cases; but when the fragments are unruly, and when pain is persistent, instead of using silver wire to hold the fragments in apposition we should employ a ligature of kangaroo-tendon, as in Case II., where it was used to hold in position the piece of bone which was broken off from the outer fragment. This piece is now firmly attached and the kangaroo-tendon ligature has been absorbed. Dr. Stimson (*Medical News*, 1885, xlvii. p. 555) had occasion to operate on an ununited fracture of the patella which had been previously wired with silver wire. On exposing the fragments he found that the silver wire had caused cavities in the fragments, and one wire was entirely, the other almost entirely, loose in the wound. He brought the fragments together with catgut. The patient was well, the fragments united, and there was some motion in the knee-joint two months after the operation. The animal ligatures, if strong and aseptic, will answer the purpose better than metal ligatures. They are soft and will not cause pressure-necrosis; neither will they act as foreign bodies, and will last sufficiently long for the process of repair to be completed. Kanagroo-tendon sutures in hernia operations last sixty days. Having the fragments held in apposition by an animal ligature, all that is necessary is to apply a dressing which will keep the parts at rest and allow repair to take place with the least possible effort. This can be accomplished by placing the arm in the Velpeau position and keeping it there by the application of bandages which have been soaked in silicate of sodium. This dressing is considerably lighter than the plaster-of-Paris dressing, and will support the parts equally well. A trap-door should be made in the silicate dressing over the seat of the fracture, so as to allow an occasional examination of the wound. The edges of the wound should be brought together with the Halsted's subcuticular suture and the wound sprinkled with iodoform and dressed with bichloride-dressings. Before the silicate of sodium bandages are applied the arm, chest, back, and the point of the injured shoulder must be covered with absorbent cotton and held in place by a flannel bandage. Unless the temperature indicates trouble, the wound needs no attention for the first week; at the expiration of that time the sutures should be removed. All the dressings should be removed at the end of the third week, and the patient should be ordered to carry the arm in a triangular sling for another week.

Since this report I have assisted Dr. J. Chalmers Da Costa in a successful case in which the centre fragment was but little more than an inch long. The case will be reported later.

REVIEWS.

THE tendency of the day is evidently toward diagnosis by the aid of laboratory methods, by the use of the microscope, the culture-medium, and the test-tube. The student is trained to be an expert in the detection of tubercle-bacilli, of differences in the appearance of cultures, of color-reactions, rather than to be a close observer of the grosser changes in the appearance of the patient, the behavior of the pulse, of the temperature, etc. The student of to-day hesitates to make a diagnosis of tuberculosis, though the constitutional symptoms and the physical signs all point in that direction, until he has found tubercle-bacilli in the sputum. The older physicians recognized typhoid fever by the prodromal symptoms, the course of the temperature, the tongue, the tympany, the condition of the bowels, the spots, the mental condition, and the spleen. The graduate of to-day withholds his diagnosis until he obtains Ehrlich's reaction or Widal's test, or finds typhoid bacilli in the blood obtained by puncturing the spleen or proves them present in the stools by Elsner's method. The tendency, therefore, is to undervalue many of the older methods of diagnosis upon which our forefathers relied.

Hare's work is written with the object of overcoming, in a measure, this tendency and of showing that much can be learned of the condition of our patients by what are commonly called symptoms. Hare does not, however, undervalue the laboratory method of diagnosis; in fact, frequent reference is made in the book to this method; but he does insist, and strongly, that by the use of our five senses, without the aid of microscopes, or test-tubes, or special instruments, great aid in diagnosis can be obtained.

The impression that one receives after reading the work is that it is a collection of most valuable hints rather than a complete and exhaustive treatise upon the subject of practical diagnosis by symptoms. Even the most skilled and experienced physician cannot help but derive good from its perusal, for he certainly will receive some new suggestions or have a well-known fact put in a new light. The statements that are made are made as the result of the author's own experience and of his wide reading, and embody many of the traditions of our forefathers which are too valuable to be lost. Some statements are made rather

dogmatically; the reasons are given why other statements are true. In some places the topics are treated with a great deal of completeness. Other subjects are rather more hastily dealt with; and, occasionally, there is what seems to us an omission. For instance, the author could well make some reference to the blue-line on the gums in lead-poisoning; and in describing the joints it would be well to refer to new-growths affecting the joints and to tubercular joints. One might take exception also to some of the statements; as, for example, where he tells us that a very large proportion of cases of epilepsy have their origin in syphilis. In general, however, the statements are such as would meet with general approbation.

The book is eminently practical. This is seen not only in the clear portrayal of symptoms in the text, but as well in the illustrations. Almost without exception these have been selected because they serve some definite purpose in making clear some otherwise obscure point. Many serve to illustrate the subject of nervous diseases; and some of the diagrams illustrating the mechanism of nervous symptoms are particularly serviceable. We would also speak of the illustration on page 322, showing the explanation of the symptoms of cirrhosis of the liver. This is a point, in reality, very simple, but yet always difficult for students to grasp, and the diagram from Taylor makes these symptoms clear at a glance.

The work is divided into two parts: Part I. dealing with the Manifestations of Disease in Organs; Part II. the Manifestations of Disease by Symptoms. Hare assumes that the natural method of arriving at a diagnosis is for the physician to note a prominent symptom, and then to consult a work under the head of this symptom, rather than to make a probable diagnosis of the disease in question and then to consult a text-book to see whether the disease fits the description in the book. Thus, for instance, the physician finds a patient vomiting. He does not make a probable diagnosis of the disease inducing vomiting, but turns rather to the article on vomiting, finds the disease of which this may be a symptom, and in that way reaches his diagnosis as to the diseased condition. While this may be true in many instances, in practice, at least, most physicians after studying the case make a probable diagnosis not upon one symptom, but rather upon the symptom-complex; and then, if in doubt, consult their references to see if this is a correct position.

The work is made much more valuable as a work of reference by two very complete indexes; one an index of diseases, the other an index of symptoms, organs, and terms. By putting in two indexes our author has really made his work available to the physician who wishes to consult it either because he believes he has a certain definite disease to deal with or because he wishes to see what disease the symptom that is present indicates.

We believe that the book is more valuable for practitioners than for students, merely for the reason that the physician of wide reading and experience takes a broad and comprehensive view of the topics treated and can place them better in their proper relations one to another. The student, with his narrower vision, is apt to get wrong conceptions of the disease from the study of single symptoms and signs. The book makes interesting reading, and, as before said, even a physician of wide experience is sure to gain much knowledge by reading it. It has appeared very opportunely and can be relied upon to call the attention of physi-

cians to the fact that, important and indispensable as laboratory aids to diagnosis are, there is yet another side to diagnosis—that of the bedside observation and interpretation of symptoms.   J. B. H.

TEXT-BOOK OF GENERAL PATHOLOGY AND PATHOLOGICAL ANATOMY. By RICHARD THOMA, Professor of General Pathology and Pathological Anatomy in the University of Dorpat. Translated by ALEXANDER BRUCE, M.A., M.D., F.R.C.P.E., F.R.C.S.E., Lecturer on Pathology, Surgeons' Hall, Edinburgh; Pathologist to the Royal Hospital for Sick Children; Assistant Physician and formerly Pathologist to the Royal Infirmary, Edinburgh. Vol. I. 8vo., pp. xix. 624, with 436 illustrations. London: Adam & Charles Black, 1896.

No one who thoughtfully reviews the progress of pathology during the past fifteen years can fail to discern the development of a very striking demonstration of the cause-and-effect relationship of the various processes of disease to their respective causes. The study of the bacteria, of their products, and of their influence in the production of certain well-marked pathological types has illumined a group of diseases formerly most obscure, and has shown the intimate relationship in each case of the specific cause to the particular structural and other changes characteristic of the disease.

Since science has long considered this simple cause-and-effect relationship an essential part of all natural phenomena, the tardy demonstration of such a relationship in pathological processes has been a distinct obstacle to the inclusion of pathology among the biological sciences. Until the appearance of final proof that in disease a similar relationship exists, and that pathological processes are governed by the same unchanging laws which control all other natural phenomena, it was almost impossible wholly to suppress the feeling that in disease we have to do with something occult and different from the ordinary phenomena of nature as revealed to us by the study of natural science. As has been hinted, this feeling was in great part due to the mystery which surrounded the occurrence of epidemics and of the endemic infectious diseases, and so long as this uncertainty continued the appeals of the pathologist to natural laws for aid in the elucidation of his problems were necessarily coupled with a measure of doubt as to the entire applicability of those laws to the processes of disease. With the demonstration of the complete causal relationship of the bacteria to infectious diseases the mystery has vanished and the last objection to the classification of pathology as a science has been removed. We may now apply with assurance the laws of physics and chemistry to the explanation of pathological phenomena.

Unfortunately, many of the authors of our text-books of pathology appear to have been slow to grasp this broader conception of disease, and their elucidation of pathological processes has been in so far limited and unsatisfactory. It is, therefore, a noteworthy merit of Professor Thoma's work that in it we meet ever-recurring evidence that the author has constantly in mind the wider relationship of disease to other biological phenomena. Everywhere he has aimed to adduce a rational

explanation of the various phenomena which he describes, bringing out wherever possible their conformity to physical and chemical laws.

As would be expected, both from the rather special field of Thoma's personal researches and from the nature of the problems presented, the application of these principles is most complete and convincing in the chapters treating of the various disorders of the circulation, of the bloodvessels, and of inflammation. Hence we find histo-mechanical principles applied to the explanation of the development of new bloodvessels, and to the elucidation of the rate and character of the blood-flow through the vessels in the various conditions of anæmia, congestion, thrombosis, embolism, infarction, etc., and in the development of a collateral circulation. Again, we meet a similar line of discussion of the various phenomena of inflammation, and are as a result afforded rational explanations of stasis, diapedesis, emigration, exudation and transudation, etc.

While about one-quarter of the book is occupied with the discussion of these subjects, we nevertheless find in it also a careful presentation of our knowledge of the effects of traumatism upon the tissues, of intoxications and infections, of malformations, of the bacteria and of parasites, of malformations, of heredity, of the various nutritional disorders, and of tumors. In this way the work is made to cover all those subjects which relate to disease in general and which, together, comprise what is now usually included in the term "general pathology."

In a work of the magnitude of the present, and dealing with so wide a range of facts, some unevenness of presentation is almost inevitable. In the book before us this is due more to the unwonted elaboration of certain themes than to the neglect of any. Thus, in the chapters dealing with the changes in the circulation incident to disease and with inflammation we have a degree of elaboration of the subject such as is to be met with in no other general work on pathology with which we are acquainted, and in contrast to this other parts of the work appear at first sight to be somewhat neglected. As we examine them more critically, however, they are found to contain a concise and philosophical statement of the subjects which they treat, in which are included all the essential facts pertaining to them. If any part of the book is at all slighted, it is that which deals with the description of the various types of pathogenic bacteria. But this can hardly be cited as a fault, since in its astonishingly rapid development descriptive bacteriology has almost of necessity become a special field of research, and, as it happens, one which has not, so far as we know, attracted Professor Thoma to its ranks. Notwithstanding his very numerous writings in other departments, we are not aware of the publication by him of any original researches upon that subject.

As has been said, then, the work may be set down as a most excellent and philosophical presentation of the facts of general pathology, with a very special elaboration of certain of its departments. Throughout it is abundantly and well illustrated by a large number of excellent woodcuts and by four chromo-lithographic plates, a large proportion of the illustrations being entirely new. At the close of each section is a carefully prepared bibliographical table of the literature bearing upon the subject under discussion, and an index completes the book.

The work of the translator has been carefully and acceptably executed.

J. S. E.

A Text-book of Bacteriology, including the Etiology and Prevention of Infective Diseases, and a short account of Yeasts and Moulds, Hæmatozoa, and Psorosperms. By Edgar M. Crookshank, M.B., Professor of Comparative Pathology and Bacteriology and Fellow of Kings College, London. Fourth edition. Reconstructed, revised, and greatly enlarged. 8vo., pp. xxx. 715. Twenty-two plates and 273 wood-engravings and photographs. London: H. K. Lewis, 1896.

This very handsome volume is a much enlarged and altered new edition of the author's well-known work upon bacteriology; so much so that, as is stated in the preface, it is, practically speaking, "a new work." Besides a careful reconstruction of the text there have been added twenty-six new chapters.

The work is divided into three parts, the first being upon methods, and including the most recent that have been generally adopted in studying the bacteria and investigating the etiology of disease. The methods of photographing the bacteria are briefly given in this division. Part II. deals with the infective diseases and the bacteria associated with them. Some of the subjects introduced are not usually spoken of in works of this kind, the writer upon bacteriology usually confining himself to such diseases as have had specific bacteria associated with them. The author's position, of which we approve, is that "in many diseases of man and animals it has not been possible to identify the contagium with a bacterium, or, indeed, with any micro-organism; but when the virus is chemically examined, or investigated with a view to protective inoculation, or utilized for experiments in serum therapeutics, such researches are within the province of the bacteriologist."

Part III. is systematic and descriptive, and contains a more or less extended account of about five hundred bacteria. The list as arranged for bacteriological diagnosis (p. 485 et seq.) is likely to be especially useful. There are five appendices upon yeasts and moulds, hæmatozoa, coccidia, apparatus in bacteriological laboratories, and bibliography, with a supplementary appendix containing extracts from the final report of the Royal Vaccination Commission.

The book is exceedingly well printed, and the plates and drawings support the author's well-known reputation in this direction. It is to be regretted that more attention has not been paid to the very excellent work done in this country.   H. C. E.

Reference-book of Practical Therapeutics. By Various Authors. Edited by Frank P. Foster, M.D., Editor of the New York Medical Journal and of Foster's Encyclopædic Medical Dictionary. Vol. I., A to Myrtol, pp. 652. New York: D. Appleton & Co., 1896.

If evidence were wanting that the days of therapeutic nihilism are past, this very satisfactory reference-book would supply it. Recognizing the patience, extensive information, and painstaking industry of the editor, a lexicographer of ability, we have expected much, nor have we been disappointed. Although he has contributed extensively to this volume, we wish at times that it had been more. Yet we cannot expect

that an editor shall be omniscient, so that errors of his collaborators escape correction. With so much that is excellent in the plan and in its accomplishment, the reviewer may seem to be captious as he calls attention to incorrect details; yet for reference accuracy is of the highest importance. We note a few departures from exactness which we have recognized. Pearson's solution of arsenic is not the equivalent of the official liquor sodii arsenatis, but is one-tenth as strong. We doubt if potassium permanganate is an antidote against all organic poisons; at least this is much further than the most enthusiastic advocate of its use (Moor) is ready to go. At times references are not to the best or most complete papers upon the subject—e. g., Asaprol, from Cerna; Cereus grandiflorus, from Sharp, who obtained nothing because he used inert material. In the last instance the therapeutic summary is hopelessly bad. In Cocillaña a glucoside is credited to Eckfeldt, whereas in 1893 Eccles found an alkaloid which he named Rusbyine. Among active principles might well have been enumerated the amaroids. Some sections are incomplete; for instance, that upon the internal use of antiseptics. The Pharmacopœial etymology and nomenclature have at times been departed from. Taken as a whole, the work shows that authors have, as a rule, been consulted in the original. Yet there are exceptions, and we appreciate the indirect compliment to the department of Therapeutic Progress of this JOURNAL in noting that one of the collaborators, at least, has consulted it. Typographical oversights are exceedingly rare; perhaps the misspelling of Susruta is the most glaring. The work will not supplant the text-book, system, nor dictionary, but it will to some extent supplement them. It will be useful to student and practitioner alike, and deserves a convenient place for daily use.

R. W. W.

Die Krankheiten der warmen Länder. Ein Handbuch für Aerzte. Von Dr. B. Scheube, Fürstl. Physikus und Sanitätsrat in Greiz, früherem Professor an der medicinschule in Kioto, Japan. Jena: Gustav Fischer, 1896.

Tropical Diseases. By Dr. B. Scheube.

The peculiarities of disease in the tropics are becoming of greater and greater importance, and for those who have to deal with them, either in their homes or in the persons of returned travellers, we know of no more useful guide than this one. That the author, a worthy disciple of the careful school of Ernst Wagner, made good use of his time while professor in the medical school in Kioto was shown before this by scattered articles and more recently by his masterly monograph on beriberi.

The various diseases are described systematically, beginning with general infectious diseases. Then follow intoxication (pellagra), diseases due to animal parasites, diseases of organs, and external diseases. The history and geographical distribution of each disease are briefly described. The remarks on prophylaxis and treatment are sufficiently

full and explicit. At the end of each chapter is a useful bibliography. A few of the author's statements seem to require comment. He believes that two distinct conditions have been and may still be included under the term typho-malarial fever. In one the patient has a combination of both typhoid and malarial infections, the clinical characteristics of which vary in different cases. The other is a malarial fever pursuing the course of typhoid. No protocols are given to sustain the latter view, the author's observations having been made before the parasites were known, but from his description we fail to see how he can apply the term as he does. A case like that of Dr. Scheube's second form (p. 95) is at the present time under the observation of the writer of this review. In this case the patient has not been exposed to malaria and his blood shows no parasites. Our experience goes to show that in non-malarial localities such cases are not rare, while, on the other hand, we know of no observation showing the existence in them of malarial parasites. The statement found in all German works on the subject, that anchylostomiasis occurs in the Southern United States, is repeated by Dr. Scheube, but as no references are cited we suppose he is only repeating the old and erroneous statements of Hirsch and others.

The author holds that amœbæ have not been proved to be the causes of dysentery, but his objections to the views of those who have a contrary opinion are not altogether relevant. Especially irrelevant are the assertions that cases of dysentery occur without amœbæ, and that amœbæ occur in the stools of persons without dysentery.

The volume is well printed. It can be recommended as a useful handbook, and especially to explorers, medical missionaries, and others who are called upon to face the diseases common in or peculiar to the tropics.   G. D.

MITTEILUNGEN AUS DEN GRENZEBIETEN DER MEDIZIN UND CHIRURGIE. (CONTRIBUTIONS FROM THE BORDERLAND OF MEDICINE AND SURGERY.) Edited by J. MIKULICZ and B. NAUNYN. Vol. I., Part IV. INJURIES OF THE VERTEBRAL COLUMN, WITH A CONTRIBUTION TO THE PHYSIOLOGY OF THE HUMAN SPINAL CORD. By THEODOR KOCHER. 8vo., pp. 245. Jena: Gustav Fischer, 1896.

A SERIES of monographs with the very happy title of Contributions from the Borderland of Medicine and Surgery has been projected by Mikulicz, the distinguished surgeon of Breslau, and Naunyn, the equally distinguished physician of Strasburg. The present contribution is an extensive monograph on Injuries of the Spine by Kocher, apparently not complete, since it terminates with the statement that the conclusion will follow. Whether this means the conclusion of the volume or of Kocher's monograph is not clear.

The portion before us consists of 245 pages of text, illustrated by five plates and eighty-six figures in the text. The illustrations are admirable; the half-tones, largely from specimens, really illustrate the text which they accompany, and give one an admirable idea of luxations, fractures, fracture-dislocations, etc., as well as the pose of

the patient after such accidents. The plate (V.) which illustrates fracture of the spine is certainly the most beautiful of the kind we have ever seen, the color and the drawing being true to life. Then follows a plate giving the cutaneous distribution of the various nerves, distinguished by varying colors, followed by two plates, admirably shown in colors, also illustrating the muscular distribution of the brachial plexus, and another of the lumbar and sacral plexus, and finally the distribution of herpes zoster of the face and neck in line with the distribution of the nerves.

In addition to this, seventy-eight cases are referred to at greater or less length. The material at hand, therefore, for so accomplished a clinician as Kocher is very great.

The book consists of two parts: first, injuries of the vertebral column with an addition on the physiology of the human spinal cord, and, secondly, lesions of the spinal cord in injuries of the verte- bræ. The author takes up contusions, distortions of the vertebræ, and unilateral luxations, and, later, isolated fractures of the vertebræ; next, total fracture-dislocations, considering them first in general, and then later the special indications in each region of the body. The same course is pursued with the spinal cord: first, partial lesions, including contusions, hemisection by stab-wounds, etc., and later the total transverse lesions. Each region of the body is considered sep- arately, from the cervical region to the cauda equina. In general it could be predicted of so accomplished a surgeon that his advice would be sound and his treatment neither too radical nor too conserva- tive.

With the space at our command it is impossible more than to indi- cate, therefore, the general scope of the work. To take up controverted points and discuss the views of the author upon each of them would burden our readers too much. It is one of the books " to be chewed and digested."   W. W. K.

THE OPERATIONS OF SURGERY. By W. H. A. JACOBSON. Third edition. 8vo., pp. xiv. 1337, with 398 illustrations. London: J. & A. Churchill, 1897.

THE nine years that have elapsed since the publication of the first edition finds the book in its third edition increased by over 300 pages and the woodcuts doubled in number. The 300 pages, however, do not represent the whole of the addition, inasmuch as the sections on Anti- septic Surgery and on Anæsthetics have been omitted and their places filled with new matter. The reason for the omission is because the author believes that Mr. Lockwood's *Aseptic Surgery* and Dr. Hewitt's *Anæsthetics and their Administration* have practically replaced the two chapters which formerly were found in his own book. We are almost sorry for the omission, because the two chapters are very important, and, at least on this side of the water, the books which are expected to replace them would scarcely be in the hands of more than an occasional reader.

It is hardly necessary to review Mr. Jacobson's book. It has so thor- oughly established itself as, at least in our opinion, the best operative

surgery that we are acquainted with, that praise seems almost superfluous. Of all the books in our own library this is the one most frequently consulted, and if American surgeons knew it as widely as we would like, it would be in every library. Its superiority to other operative surgeries consists in the fact that it is far more than a mere manual of surgical technique. It considers in almost all operations the indications for the operations, the danger and difficulties the surgeon will encounter, and the modes of avoiding them or meeting them, the causes of failure, the aids in difficult cases, and in very copious foot-notes many details both of theory and practice which are of the greatest possible value.

American surgeons certainly have every reason to feel kindly to Mr. Jacobson, for he has been most generous in his recognition of their work. In running over the index of names for only the first four letters of the alphabet, we have found over twenty American surgeons whose work is referred to. On page 1302 Cheever has an unnecessary ''s'' and Halsted an unnecessary ''a'' in his name.

It seems strange to us in America that a man of Mr. Jacobson's years and fame should still be "*Assistant* Surgeon to Guy's Hospital," but then we suppose we ought to remember that the Prince of Wales is hard on to threescore years. Certainly Mr. Jacobson's renown has added much to that of Guy's Hospital, and we hope will long continue to add to its lustre.

We note one sorrowful change from the last edition: the dedication to his "three old friends," Arthur E. Durham, James F. Goodhart, and Edwin C. Greenwood, has added to it an appropriate Latin eulogy of Mr. Durham, who was so well known to many of his American readers and is lamented by them all.   W. W. K.

THE RETROSPECT OF MEDICINE. A HALF-YEARLY JOURNAL CONTAINING A RETROSPECTIVE VIEW OF EVERY DISCOVERY AND PRACTICAL IMPROVEMENT IN THE MEDICAL SCIENCES. Edited by JAMES BRAITHWAITE, M.D. Lond., etc., assisted by E. F. TREVELYAN, M.D. Lond., B.S., M.R.C.P., etc. Vol. CXIII. January to June, 1896. London: Simpkin, Marshall, Hamilton, Kent & Co., Limited.

THAT this well-known work retains its favor with the profession is due to the wise selection of its matter. Especially within the last few years have periodic reviews of medical progress multiplied. Many of them are much larger than *Braithwaite*, and so can give a much more extensive review than is possible in a smaller compass. But for the busy physician, who looks rather for a careful selection of the news of the day than for a survey of the whole field, this volume is difficult to excel. The selections are almost always admirably chosen. Occasionally an article of minor worth has been selected. So Fränkel's thyreo-antitoxin is mentioned, but not Baumann's more important thyroiodin. For the purpose we have mentioned, it is perhaps not an objection that many of the articles are taken at second hand. The printing and paper of the present volume are much better than in the edition long popular in America, and will no doubt assist in keeping up the reputation of the series.   G. D.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.D., LL.D.,

PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL
SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

Treatment of the Bubonic Plague.—Dr. E. Roux describes the preparation of the serum by Yersin as follows: The subcutaneous injection into horses of a fresh plague-bacillus culture upon agar having been followed by severe local swelling, a fever which disappears, and an abscess, the intravenous inoculation was resorted to, and in this way abscess-formation was avoided. Vigorous reaction follows these injections until, after repeated and stronger doses, immunization is accomplished. Three weeks after the last injection a serum is obtained by venesection. In the first instance of its use two injections of two drachms each sufficed for a cure. Of twenty-three patients subsequently treated, but two died; both received their first treatment on the fifth day of the disease, one dying five and the other twenty-four hours after the single injection. It should be remembered that the serum does not long retain its activity, and, as compared with that for the treatment of diphtheria and tetanus, that it is weak. It is desirable that we should have a more powerful serum, which shall act better and in smaller doses. In four instances more serum was used than was necessary, and injections were made during convalescence in order to insure cure. To answer the question whether this serum possesses an antitoxic or only an antibacterial action presupposes a knowledge of the toxin of the plague; this is wanting. Although at present this serum has been used only upon patients with developed disease, yet it is fair to presume that it is still more valuable as a preventive, thus limiting the disease to its point of outbreak.—*Therapeutische Wochenschrift*, 1897, No. 5, S. 97.

Peronin.—Dr. Schröder presents this remedy as useful for the cough of tuberculous patients. This is produced when the hydrogen atom of the hydroxyl group of morphine ($C_{17}H_{18}NO_2(OH)$) is displaced by the alcohol radical ($C_6H_5CH_2$). In twelve instances, reported in detail, comparison has

been made between the effects produced by this drug and those from codeine phosphate. The remedy was administered on an average of seven days, in doses increased from one-third to two-thirds of a grain. In eight of these the cough-irritation was immediately and markedly relieved; in two this was obtained only after larger doses, and in two there was no result. As to the amount and ease of the expectoration, in six cases there was no result; in five it was checked; and in one it was lessened, but more difficult. There was no disturbance of digestion, except that two patients complained of morning nausea and tendency to constipation. In all cases there was better, more restful sleep. In two instances, after larger doses, on the following morning there were noticed headache and lassitude, more frequently observed after morphine. It is preferable to codeine in that the sleep is better and there is no excitability. The remedy can be administered in solution in water, tea, with alcohol, or as a pill.—*Therapeutische Monatshefte*, 1897, Heft 1, S. 4.

The Analgesic Effect of Lactophenin.—DR. CHARLES S. POTTS reports that he has made use of this drug in five cases of neuralgia involving the branches of the trigeminus, four of which were relieved; in one case of severe sciatica that was benefited for a time; in two cases of severe reflex pain, due to irritative conditions elsewhere; in two cases of migraine, two of muscular rheumatism, two of the characteristic pains of tabes dorsalis, all of whom received benefit from its use; and in four cases of simple headache, presumably benefited. The dose varied from four to ten grains.—*Therapeutic Gazette*, 1897, No. 1, p. 8.

Eucaine.—MESSRS. W. JOBSON HORNE and MACLEOD YEARSLEY report their observations, using this anæsthetic in the surgery of the throat, nose, and ear. The solutions were of the strength of 2, 5, and 8 per cent. The first was quite sufficient for anæsthetizing the uvula, for laryngoscopy or posterior rhinoscopy, and for aural examinations. The 5 and 8 per cent. solutions were used for operative measures. The methods of application are: (1) For the ear, warm instillations retained for from five to eight minutes by inclining the head to the opposite side. (2) For the nose, either simple swabbing or the insertion of a pledget of cotton (soaked in eucaine solution) for five to ten minutes. (3) For the throat, simple swabbing with a pledget of cotton. On no occasion was the drug applied by means of a spray. The anæsthesia is slightly slower in onset than that of cocaine, but when established is fully equal to it. The duration of anæsthesia is from ten to twenty minutes. So far as may be concluded from these observations the pulse has remained the same in rate and character throughout; in no instance has there been any slowing. In the only instances of unpleasant effects upon the circulation, three in number, the cause could not be attributed to the action of the drug. The local effects have not been completely studied. It has not been found to cause hyperæmia of the turbinate bodies; in fact, in several cases it has caused slight ischæmia, which, however, was not to be compared with that of cocaine. In no case was there hemorrhage after operation. Whether or not it has any effect upon the amount of saliva must be left for future investigation. With the exception of the three instances above given there have been no unpleasant after-effects noted. Eucaine cannot,

however, wholly replace cocaine, since the effect of the latter in reducing the size of the turbinate bodies gives it a value as an aid to diagnosis which the former apparently does not possess.—*British Medical Journal*, 1897, No. 1821, p. 134.

DR. LEWIS S. SOMERS writes of this drug as a local anæsthetic in hypertrophic rhinitis. A 4 per cent. solution in distilled water, applied on a bit of cotton, produced anæsthesia in from eight to ten minutes, which lasted about twenty minutes. It produces a temporary local congestion, which militates greatly against its use in active inflammatory conditions; but this may possibly be obviated by using equal parts of eucaine and cocaine, as recommended by Berger. Reichert claims that, aside from its anæsthetic action, it is harmless in medicinal doses, not rapidly and suddenly affecting the heart, as does cocaine; and, further, that it exerts a curative action in diseases of the Schneiderian mucous membrane, independent of its anæsthetic properties. Another advantage is that it may be kept for an indefinite time in a 1 to 10 solution in sterilized water, which may be repeatedly boiled without losing its anæsthetic properties.—*Therapeutic Gazette*, 1897, No. 1, p. 11.

DR. P. SILEX remarks that this drug, although producing anæsthesia of the cornea, caused severe burning and marked injection of the conjunctiva, so that its use was soon discontinued. In seeking a substance which should be free from these undesirable properties another substance was discovered which chemically is not only related to eucaine, but also to cocaine, and especially to tropa-cocaine, but differing from the last in that it is much less toxic. This can be boiled without decomposition, and is soluble at ordinary temperatures up to 5 per cent. It does not produce irritation, and can be used for subcutaneous injection and by Schleich's infiltration method. This substance, in distinction from eucaine, has been designated eucaine B. When used in 2 per cent. solution it anæsthetizes with greater rapidity than does eucaine, and that without change in the calibre of the bloodvessels in one-half of the cases; in the other there is a slight pericorneal injection. The diameter of the pupil is unchanged, the sphincter reacting to light and convergence. Its use upon inflamed eyes and for operation shows that this is a real addition to the therapeutic resources for producing local anæsthesia.—*Deutsche medicinische Wochenschrift*, 1897, No. 6; *Therapeutische Beilage*, S. 1.

The Medical Treatment of Epilepsy.—DR. FREDERICK PETERSON notes among recent remedies one to two or three drachms of the tincture of simulo thrice daily are harmless and deserve trial. Solanum carolinensis in his hands has proved of no value whatever. The opium-bromide treatment of Flechsig is of great value for many patients, especially in old and obstinate cases, when all other agents have proved ineffectual. Adonis vernalis conjoined with the bromides is an efficient method of treatment. In cases of autointoxication the regulation of the diet, frequent drinking of hot water, occasional flushing of the large intestine, the use of intestinal antiseptics, are all indicated.—*New York Medical Journal*, 1896, No. 914, p. 738.

The Effect of Diet upon the Fits of Epilepsy.—DR. ALEXANDER HAIG from his studies believes that the uric-acid fluctuation is the cause of the

fits. By diet he reduces the intake and formation of uric acid, so that the largest quantity that the patient is likely to get into his blood as the result of such fluctuation shall never, or only very rarely, be sufficient to affect the blood-pressure and the intracranial circulation to a serious extent. The epileptic wave of excretion runs very high, but only for a short time, and it is very difficult to keep the general level of uric-acid excretion so low that these waves shall not occasionally get high enough to do damage by raising the blood-pressure and affecting the intracranial circulation. Here flesh-food must be avoided entirely and all soup and meat-extracts regarded as poisonous: while tea, coffee, and cocoa, and all other vegetable substances containing xanthin compounds, are to be regarded as containing uric acid, and used, if at all, only as the merest flavoring. From the facts mentioned in this paper it is pretty clearly shown that the fits of epilepsy and convulsions in general have an extremely close relationship to the uric-acid headache (migraine), and like this are probably functional disorders due to altered circulation in the brain, such altered circulation again being due to the contracted arterioles and high blood-pressure caused by uric acid. Since the headache is controlled with almost absolute certainty by a diet which frees the blood from the excess of uric acid, so it is hoped that it will be found that many fits will yield in the same way to well-directed treatment.—*Brain*, 1896, Part 2, xxiii. p. 68.

The Composition and Action of Natural and Cultivated Vaccine and Variolous Material.—DR. JOHN B. BUIST finds that it is expedient to sterilize tubes before using them, as opacity develops sooner in lymph stored in commercial than in sterilized tubes, and it is greater in amount. To prevent this opacity there must be sterility of the fluid and of the tubes. Since arm-to-arm vaccination conducted under a cloud of carbolic spray was a complete failure, it is proved that antiseptics and active vaccine material are incompatible. After experimentation the conclusion was reached that modified vaccine materials produced by growing lymph in solid media were unsuitable for vaccination purposes ; because, if vaccine lymph be really modified variolous lymph, the cultivated vaccine materials were further modifications of a modification, and success in this direction was impossible. It appeared more probable that variolous lymph might be easily modified by cultivation otherwise than in the animal body, and that this cultivation of variola would be a true modification of the specific virus, having properties of a much milder character than the original. Experimental vaccination proves that these cultivated materials differ from the natural, not only in form, but in physiological action ; and the conclusion is irresistible that they are not in that form the cause of either local vaccinia or variola. While, therefore, a bacterium of constant form to be found in clear vaccine and variolous lymph is probably the cause of vaccinia and variola, it appears to be practically impossible to reproduce the same bacterial form by artificial cultivation in solid media outside the animal body. The organisms in vaccine and variolous cultivations are growth-forms or developmental conditions of the organisms in clear lymph. The organisms in clear lymph are spores which develop into the large forms when cultivated in solid media. Clear vaccine and variolous lymph, in the author's opinion, contain spores of bacteria in suspension,

which are distinguished from the micrococci of cultivation by their characteristic difference in size. In the same way opaque lymph, which is an imperfect material for vaccination, may be regarded by a natural cultivation of the organisms existing in clear lymph, and this natural cultivation is the cause of the opacity of lymph. On comparing opaque with clear lymph we find that there is a great increase of organisms in the former and that they are distinctly different in size and arrangement. Clear lymph is alkaline and opaque lymph is acid in reaction, and this is observed not only in stored lymph, but also in fresh, opaque lymph as it issues from an inflamed vesicle. If it is desired to prevent the development of the spores, the lymph must be dried, which preserves the bacterial form originally in the lymph at the time of storage.—*The Practitioner,* 1896, No. 335, p. 480.

The Accidents of Vaccination.—MR. T. COLCOTT FOX places in the first group all those deviations from the typical evolution of the vaccine vesicle, and from the normal accompanying symptoms, which are not due to impure lymph, but ascribable to the vigor of the lymph, to the idiosyncrasy or special constitutional condition of the subject, or to imperfection in the details of the operation. These are various, and should be carefully separated from those due to other causes. Under this head may be considered the incidental exanthematic eruptions. The second group considers diseases (chiefly of a septic nature) which find a place in the wounds subsequent to the operation, and these are in many respects the most formidable, and are for the most part quite preventable. They are mainly responsible for the ill-repute which vaccination has earned with many people. Among these diseases may be cited septicæmia, pyæmia, tetanus (rare), erysipelas, cellulitis, gangrene, ulceration, contagious impetigo. The views of Hutchinson in regard to antiseptic precautions are regrettable. It is the duty of the vaccinator to take all possible precautions. The last group comprises diseases inoculated with vaccinia at the time of the operation. By using pure humanized or bovine lymph and insistence upon clean instruments we have almost complete immunity against disaster. Syphilis may be communicated, and syphilitic infants which appear to be perfectly healthy may be the source of infection. It is doubtful if leprosy can be thus inoculated. Although the inoculation of tuberculosis is a possibility, it must be a rare one. In subjects specially predisposed to certain diseases it is possible that these will be excited to activity. These are eczema, urticaria, very rarely psoriasis, and lichen urticatus.—*Ibid.,* p. 492.

Grindelia Robusta.—DOTT LUIGI D'AMORE has made an elaborate laboratory study of this drug. He finds that in frogs it produces first a paralysis of the higher nerve-centres, then of the inferior. The nerves and muscles preserve their excitability only through direct action upon them, so they at last lose their irritability. With dogs it was found that large doses depress and weaken the nerve-centres after having markedly excited them. With frogs, when the drug is applied to the heart, there is a slow and progressive diminution of the beat and a lengthening of the systole ; sometimes the action is so energetic that there is a rapid diminution of the number of beats and arrest of the heart in systole and with an inexcitable myocardium. With warm-blooded animals the phenomena which it produces may be ascribed to an

exciting action upon the bulbar centre of the pneumogastric, which, when a large dose is introduced at one time into the circulation, appears to be paralyzant. The effects upon blood-pressure are that with small doses there is a slight raising, which is more evident with medium doses; but as the amount is increased the pressure gradually and continually falls during the same time that the oscillations are shorter. In its action upon the respiratory system we have the most interest, for here we find the most extensive use of the drug. Experiments show that when its effects on the pneumogastric are considered, and also its power of contracting bronchial muscles and its action on the heart, that it is likely, in proper doses, to be of value as a remedy for the symptom of asthma. When in addition we bear in mind that the drug contains an active principle, likely a terpene, which benefits the associated catarrh, the clinical use of the drug has a scientific foundation. So far as its effect on bodily temperature exists it apparently possesses a paralyzing action on the thermogenic centre. The secretions are changed as follows: the urine is increased by small and diminished by large doses, partly from changes in blood-pressure and partly from direct action on the renal epithelium. The saliva and bile are increased. Both urine and saliva are of greenish tinge.— *Giornale della Associazione Napoletana di Medici e Naturalisti*, 1896, Puntata 5a e 6a, p. 331.

The Treatment of Acute Broncho-pneumonia in Children.—DR. LE-GENDRE states that fresh air in the sick-room is important, and water should be kept boiling to which antiseptic substances should be added, as carbolic acid, tincture of benzoin, or eucalyptus leaves. The decubitus should be frequently changed; in the case of larger children they should be kept in a half-reclining posture. During the active period nauseating drugs, as the antimonials (kermes mineral and tartar emetic), senega, and ipecac; stupe-facients, as aconite and opiates; sudorifics and diuretics, as ammonium acetate and jaborandi, should be avoided. Blisters should never be used. The therapeutic indications are based upon the congestive forms of asphyxia or upon the cardiac paralyses, or when there are nervous symptoms—delirium, convulsions—or when there is insufficiency of nutrition. To prevent active hyperæmia cold-packs over the chest are employed until the number of respirations falls one-fourth, one-third, or even to one-half of their former frequency. For cardiac paralysis caffeine holds first rank, given hypodermatically, as often and in as large doses as is necessary, avoiding cerebral excitement, headache, and insomnia by dividing the doses. Next comes digitalis, slow in its action, but more lasting. Sparteine and strychnine are useful for combating weakness, as is also alcohol in its various forms.—*Bulletin Général de Thérapeutique*, 1896, 6e liv. p. 269.

The Effect of Massive Intravenous Injections of Simple and Compound Saline Solutions.—MM. F. J. BOSC and V. VEDEL state that distilled water is harmful when injected into the veins, even in small amounts, causing bloody evacuations, globular lesions, and hemorrhage. It should be rejected as a vehicle for any substance intended for intravenous injection. Ordinary water is not of a toxic character. It gives rise to an abundant diuresis without hæmaturia or albuminuria, a slight elevation of temperature, and its

harmful action upon the red globules is but slight. It can then, *à la rigueur*, be introduced into the vessels, alone and in large doses. Of simple saline solutions it may be stated that they can be employed on condition that triple the amount of sodium chloride in the blood is not surpassed. These injections of 5 to 7 *per mille* can be introduced at the rapidity of ¼ to 1 ounce per minute to doses of 1 to 3½ ounces for each pound, and at temperatures ranging from 102° to 68° F. These are entirely harmless, temporarily slowing the respiration, accelerating the heart, but not changing the blood-pressure. They elevate the rectal and peripheral temperature about three and one-half degrees, a true febrile attack, and producing within an hour abundant discharge of clear, non-albuminous, non-saccharine urine. These effects are independent of the temperature of the liquid and the rapidity of injection, within the limits given above. The solution of seven is preferable to that of five *per mille*. The solution of sodium chloride and sodium sulphate, equal parts (seven *per mille*), does not present any difference in results from those of the simple saline, and therefore is not superior to it. The simple saline solution of the above strength possesses the minimum of harmful effects and the maximum of physiological effects, and should be the solution of choice for massive intravenous injections.—*Archives de Physiologie*, 1896, No. 4, p. 937.

Nutrose vs. Liebig's Meat-peptone.—DR. BORNSTEIN makes the following comparisons : 1. Nutrose (casein-sodium) is of pleasant taste ; the peptone tastes badly. 2. Nutrose is completely absorbed in the intestine without producing symptoms of irritation ; peptone irritates so that generally it cannot be used for a long time. 3. Nutrose is not more expensive than peptone. 4. Nutrose is completely utilized—better than meat ; peptone is of itself of less value than meat.—*Therapeutische Monatshefte*, 1896, Heft 10, S. 561.

Kola during Labor.—DR. F. GUNDRUM administered a teaspoonful of the fluid extract every hour during the labor of a patient who had recently suffered from an obstinate malarial fever, during which she had undergone a rather severe uterine hemorrhage. Owing to an irritable stomach but little food had been taken during her illness, so that she was in a condition of great weakness when labor began. The progress of the parturition was easy, and there was an entire absence of weakness and exhaustion.—*Therapeutic Gazette*, 1896, No. 12, p. 802.

The Treatment of the Vomiting of Tuberculous Patients.—M. MATHIEU notes the importance of checking this grave symptom, which so seriously interferes with nutrition. Since these patients vomit because they cough, the plan of preventing the former by treating the latter symptom has resulted in giving opiates, cocaine, or bromides, and in making various revulsive or sedative applications to the epigastric region, as blisters, actual cautery, ether-spray, belladonna, or cocaine-plasters. With any of these, failures are more frequently encountered than success. Since these patients vomit because the food excites the gastric mucous membrane, which has the same nervous supply—the pneumogastric—as the lungs, therefore the gastric mucous membrane is the starting-point of the expulsive reflex. Two remedies are

cited. Chloroform-water is diluted with an equal part of ordinary water and given by the mouth in doses of from two to four teaspoonfuls every ten minutes. The other is three grains of menthol dissolved in five ounces of menstruum, of which the same dose as above is given at intervals after meals. Besides these, small portions of ice may be swallowed immediately after the meals. In the majority of instances the employment of these methods has been followed by success.—*Bulletin Général de Thérapeutique*, 1896, 23e liv. p. 720.

The Medical Treatment of Cancer of the Stomach.—M. Albert Robin, for awakening the appetite, uses a decoction of the bark of white condurango (15 to 250, boiled to 150) in dessertspoonful doses before each meal, or the tincture of nux vomica or ignatia in five or six drop doses before meals. After meals a capsule of ammonium chloride, two and one-half grains; sodium bicarbonate, four grains; and Dover's powder, one and one-half grains, is given. For assisting digestion during the meal a glassful of hydrochloric acid in water (1.66 to 1000) is sipped; and in the midst of the meal is taken a powder consisting of pepsin, seven and one-half grains; maltine [diastase], one and one-half grains; and pancreatin, the same quantity. For diminishing the fermentation, sulphur, sublimed, washed or precipitated, two and one-half to three grains; or a dessertspoonful of ammonium fluoride in water (1 to 300), during the meal. Or at its termination, in a little water, one and one-half grains of granulated naphtol may be given. If there is very acid vomiting, severe pain, or stenosis, lavage is useful.—*Bulletin Général de Thérapeutique*, 1896, 11e liv. p. 481.

The Treatment of Infantile Diarrhœas.—Dr. Lesage relies upon (1) an absolute diet of milk, even sterilized. (2) For drinking-water (Vals.), albumin-water, or water medicated with lactic acid, antipyrin, tannigen, benzonaphtol, or bismuth salicylate. (3) If the disease is serious, subcutaneous injections of artificial or blood-serum should be used. The former are of two kinds: (a) of massive dose or (b) of small dose. If the former, either sodium chloride in sterilized distilled water (7 to 1000), or sodium sulphate, 10; sodium chloride, 5, in sterilized distilled water, 1000; may be used in dose of an ounce three to six times daily. The purpose of these injections is to introduce into the circulation a large quantity of liquid to make up for losses by the intestine. Besides, they have a stimulant effect. The indications for their use are an algid type of infection and abundant loss of water. Of the second type are the small injections, for which the indications are emaciation, cachexia, atrophy with chronic debilitating diarrhœa. Two subcutaneous injections each day are given, to the amount of a drachm of the following solution: carbolic acid, 1; sodium chloride, 1; sodium phosphate, 1; sodium sulphite, 1; in distilled water, 100. The massive injections are contraindicated in manifest or latent tuberculosis. Provided that the viscera are healthy and lymphatic ganglia are normal, the small injections are indicated for all cachectic infants. In obtaining a specific blood-serum it is necessary to take into consideration the results of previous investigation, which, in brief, show that the agent of fermentation in milk is the bacterium coli, and it is this micro-organism which produces the virulence; as for the

other microbes, not one possesses virulence, and all are harmless, even in large doses. In diarrhœa due to milk the bacterium coli isolated from it has the same virulence as the bacterium coli from milk, and the other microbes of these diarrhœas are harmless. Without going into particulars, it is stated that with the bacterium coli isolated from virulent milk and from the diarrhœa of nurslings, we can obtain by treatment of an animal (the ass) a serum which possesses particular specific qualities which the normal blood-serum does not. The same results have not been obtained in immunizing the animal with cultures of the virulent bacterium coli of the adult or with the normal bacterium coli of the nursling. Fifty-two children affected with serious infantile diarrhœas have been treated by an injection of a drachm of the serum, which may or may not be repeated upon the second day. In twenty-six the morbid phenomena ceased within forty-eight hours ; in fourteen there was a diminution of infection and of diarrhœa, and after five or six days health was restored. In twelve instances the result was *nil*. In all cases where the diarrhœa was green, acid, bilious in character, the injection immediately caused the color to disappear. This fact is important, because it shows that the serum acts upon the liver, with limitation of the super-activity of that organ and the diminution of the amount of bile.—*Revue de Thérapeutique Médico-chirurgicale*, 1896, No. 24, p. 745.

The Use of Diastatic Ferment.—Dr. H. Leo recommends the use of taka-diastase in gastric hyperacidity, both when uncomplicated and in connection with ulcer. In these instances the starchy foods should be taken at the commencement of the meal, and when taken with the above-mentioned remedy the conversion of the starches will be continued in the stomach for a long time. He has noted that in instances of hyperacidity the pain has been, by this method, markedly diminished. In addition, the obstinate constipation so often associated with this symptom has generally disappeared.—*Therapeutische Monatshefte*, 1896, Heft 12, S. 635.

Death following the Administration of Nitrous Oxide.—Dr. H. A. Hare reports an instance, not as death due to the direct influence of nitrous-oxide gas, but as illustrating the fact that the morbid rise of arterial pressure which is produced by the administration of this drug during the period of anæsthesia may cause the rupture of a bloodvessel in persons who have a tendency to apoplexy. A man between fifty and sixty years of age, who had previously taken gas without ill effects, took the ordinary quantity for the extraction of two molar teeth. He returned to consciousness with the usual rapidity, began to cleanse his mouth, when he remarked that his right hand felt numb, and that this numbness rapidly extended up his arm and to his side and leg. He became partially unconscious within a few minutes, and shortly after, comatose, dying about twelve hours later.—*Therapeutic Gazette*, 1896, No. 12, p. 801.

Salol in the Treatment of Acute Angina in Children.—Dr. Carron de la Carrière states that the peculiar properties of this drug are antiseptic, generally analgesic, with selective action upon the larynx. It relieves the pain and dysphagia, improves the physical signs, prevents abscess-formation,

and shortens the duration of the disease, especially if administered soon after its onset. The daily dose is seven and one-half grains for each year to the fourth, thirty grains to the eighth, and forty-five grains to the fifteenth year. The only contraindication to its use is a pathological condition of the kidneys, which is exceptional in children. The formula is: salol, 2; oil of sweet almond, 4; powdered acacia, 4; syrup, 30; distilled water, 60. Peppermint, orange-flower, vanilla, or cherry-laurel water may be added for flavoring. The daily dose should be divided into three parts and taken at equal intervals. Its use should be suspended when the color of the urine becomes darker. In case of threatening abscess the dose should be pushed until this change appears, which is evidence that the organism is well under the influence of the drug.—*Journal des Praticiens*, 1896, No. 49, p. 772.

The Antitoxic Action of Sodium Hyposulphite in the Presence of the Dinitriles.

—DRS. J. F. HEYMANS and PAUL MASOIN cite the demonstration by Lang that this drug possesses an antidotal action in the presence of potassium cyanide, quite likely through the transformation of the CN group into CNS. From elaborate experimentation they conclude that when the dose of malonic nitrile ($CN—CH_2—CN$) is not greater than nine times the fatal dose, no matter by what route it is administered nor what is the duration or severity of the poisoning, provided that the respiration shall persist a few minutes after the administration of the antidote, we can save the life of the patient by giving a sufficient dose of the sodium salt, and cause, as if by magic, within five or ten minutes, the disappearance of the respiratory and circulatory symptoms. So far as concerns cyanogen ($CN—CN$), there is an antitoxic action which is real, but which shows itself within narrower limits than with the above-mentioned substance. With succinic nitrile ($CN—CH_2—CH_2—CN$), the superior limit of antitoxic power is about ten times the fatal dose. With pyrotartaric nitrile ($CN—CH_2—CH_2—CH_2—CN$) the results are similar so long as the quantity of the antidote is sufficient, so that it shall be retained in the organism so long as is the poison.—*Archives de Pharmacodynamie*, 1896, Fascicule 1, p. 77.

The Treatment of Infectious Endocarditis.

—DR. H. HUCHARD hopes that in the future a treatment will be found which is directed toward the microbe. In the meantime the toxins must be eliminated by the kidneys, and for this purpose a milk-diet and various diuretics, as theobromine or caffeine, may be ordered. Especially to be avoided are those drugs capable of closing the kidney, as antipyrin, which has the further inconvenience of interfering with the cardiac contractility, or acetanilid, which may cause cyanosis, or thallin, which only relieves the fever, as if that were the cause of the severity of the disease. The heart should be strengthened by digitalis, hypodermatic injections of caffeine, camphor in oil, sparteine, or of ether. Here digitalis has a double action when used in moderate doses; it lessens the exaggerated action of the heart and thus, to some extent, prevents the detachment of septic or simply obliterating emboli.—*Journal des Praticiens*, 1896, No. 43, p. 673.

MEDICINE.

UNDER THE CHARGE OF

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The Leucocytes in Pernicious Anæmia.—In reporting a case of pernicious anæmia that recovered under the use of salol, along with ferratin, bone-marrow, oxygen, arsenic, iron protoxalate, and quinine, DIEBALLA calls attention to the importance of examiuation of the leucocytes in this disease (*Zeitschr. f. klin. Medicin*, Bd. 31, p. 47). In the case reported, a full descrip_ tion of which must be omitted here, the leucocytes were reduced in number, the reduction being due to relative decrease of the polynuclear cells. From the fact that reduction was only moderate and eosinophile-cells were present in normal proportion, the author concluded the spleen and bone-marrow were not excessively degenerated. That the various kinds of leucocytes vary in proportion in different cases of pernicious anæmia has been shown by cases previously reported. Usually the eosinophiles are much reduced, but in another case of the author's they were present to the extent of 8 per cent. Although the author's conclusions are not all warranted by present knowl-edge of the development of the blood, his paper is important in pointing out the need of a more careful examination of the white blood-corpuscles in per-nicious anæmia, in the first place, with a view to increasing knowledge; in the second, for prognostic purposes, should the results be confirmed. The successful outcome of the case is ascribed to the action of the salol on germs in the intestinal canal, and the stimulating effect of the iron, etc., on the blood-forming organs.

The Degeneration of Leucocytes in Leukæmia and Severe Anæmias.—GUMPRECHT has performed a valuable piece of work in studying the degen-eration of leucocytes in various diseases. After a *résumé* of the rather scanty literature of the subject he describes some experiments on the degenerations found in tissues kept for some time post mortem, and formulates some gen-eral statements regarding cell-degeneration. The occurrence of pathological degenerations of leucocytes in the blood is then taken up. In normal blood and in mild anæmias and chlorosis little or no evidence of nuclear degenera-tion is seen, for the reason, no doubt, that the results of normal break-down are rapidly swept out of the circulation. In leukæmia, both acute and chronic, and in pernicious anæmia, degenerations are common. In acute leukæmia as many as 11.5 per cent. of leucocytes were degenerated, though usually the proportion was less than half of this. In one case of pernicious anæmia there were 10 per cent., but in other cases not more than 1 or 2 per

cent. All kinds of cells show the degeneration, but the lymphocytes and myelocytes are the most important. Changes in the polynuclear cells are not so common in leukemia as in severe anæmias. Various forms of degeneration are found, such as swelling and vacuolization of nuclei, hypo- and hyperchromatosis, the various changes being illustrated by drawings. The degenerations are readily studied in cover-glass preparations made in the usual way, it being easy to see that they are not artefacts. The relation of the degeneration of leucocytes to increased excretion of nuclein-products in the urine is alluded to.—*Deutsches Archiv für klin. Med.*, Bd. 57, p. 523.

Sinus-pleurisy.—Koll (*Deutsches Arch. f. klin. Med.*, Bd. 57, p. 596) reports a number of cases of pleurisy having certain peculiarities not often described. It is somewhat remarkable that about thirty cases were observed in one year and only occasional ones later. The disease appears as a dry pleurisy, almost always in the anterior and lower pleural sinus. The disease begins usually with slight fever and other general symptoms, sometimes with chill, without apparent cause. In two cases there was articular or muscular rheumatism. It was never associated with such diseases as nephritis or diabetes. In two cases the onset was slow; in one the patient stated he had a similar attack five years before. The subjective symptoms often suggested an acute or chronic disease of the stomach. There was a painful spot just below the ensiform, increased by eating, by pressure, and by forced inspiration. About a third of the cases had eructation and vomiting. One patient, admitted with the diagnosis of gastric ulcer, was almost unable to take nourishment on account of these symptoms. Nearly all the patients complained of pain on both sides of the sternum. There were at times palpitation of the heart and frequent pulse. In all cases there was fine friction over the region of the pleural sinus in the heart-region and along the lower lung-border, usually at the end of inspiration and beginning of expiration. The course of the disease suggested the existence of an infection; the spleen was in many cases enlarged. In a case following arthritis mitral endocarditis also appeared, and in another case acute endocarditis developed without symptoms of rheumatism or other discoverable cause. The course of the disease is chronic and irregular and subject to exacerbations. The subjective symptoms subsided in eight or ten days, but the physical signs remained as before. Salicylic acid, phenacetin, etc., had no effect. The author believes this form of pleurisy has not been described before. He mentions the points of resemblance and difference as compared with the indurating, circumscribed pleurisy of von Ziemssen, and with diaphragmatic pleurisy.

Osteomalacia.—Senator reports an interesting case of osteomalacia. The patient lived near Frankfort-on-the-Oder, where osteomalacia is rare. The symptoms began after the third and last pregnancy, in 1888, with weakness and pain, the latter soon becoming permanent. There was pain over all the large nerves, in the ovarian regions and in the muscles. The vertebral column was strongly curved; some of the bones were sensitive to pressure. The pelvis was osteomalacic. The patient improved very much. Thyraden and ovarin were used at different times, and although Senator does not think the improvement was due to the treatment, some interesting facts regarding

these substances were obtained. Under both remedies the quantity of urine and the nitrogen, phosphates, and lime in the urine were increased. The alloxan bodies were increased under ovarin. Lactic acid was never found. The alkalinity of the blood (one examination) was much increased. The blood showed nothing of note. The feces, under the administration of ovarin, contained more lime than before. The increase in the excretion of lime during improvement is especially important, because Fehling found the same thing in cases improving after castration.

The influence of the ovarin on the tissue-change of the patient led Senator to make experiments on other diseases. In climacteric disturbances he had favorable results. As a diuretic ovarin was useful only in some cases of nephritis; not at all in heart or liver cases. There was no effect in Basedow's disease. The tablets were well borne and the observations encourage further experiments.—*Münch. med. Woch.*, 1897, No. 3.

A New Symptom of Stenosis of the Trachea.—The symptoms of tracheal stenosis are few and not always certain. A new one recently described by AUFRECHT (*Centralblatt für inn. Med.*, 1896, No. 1) will therefore be looked for with interest. If the patient is examined with the stethoscope over the trachea, just above the sternum, the normal loud bronchial breathing usually heard in both phases of respiration is either replaced by a short, soft breath-sound or else is quite inaudible. This has been found by Aufrecht three times, twice in cases of mediastinal cancer growing into the trachea and once in a case of gumma compressing the trachea. The explanation of the phenomenon is as follows: in the normal condition the air passing from the narrow glottis into the wide trachea causes bronchial breathing on account of the formation of eddies. For this a certain rapidity of the air-current is necessary, and this is furnished under ordinary conditions by the even calibre of the trachea. If the latter is narrow, so that the lumen approaches that of the glottis, the eddies coming out of the glottis must become weaker and so produce the modification described.

Cancer of the Stomach.—As the result of the examination of forty-two cases of cancer of the stomach, HAMMERSCHLAG gives some data useful in the early diagnosis of cancer of the stomach. "If a number of examinations during a period of three or four weeks show a constant absence of free hydrochloric acid, albumin digestion reduced below 15 per cent., much lactic acid, and numerous long bacilli, and if no improvement occurs in this time, the diagnosis of cancer can be made almost with certainty, even if tumor and cachexia are absent. The recognition of a loss of motor power, soon appearing and increasing rapidly, and the finding of small quantities of blood in the stomach-contents, are also important. The diagnosis is not certain, however, for in dilatation without cancer lactic acid may be present and the chemical conditions in cancerous stenosis of the pylorus vary according to the previous occurrence or absence of ulcer. Neither deficient HCl nor marked loss of peptonizing power is peculiar to cancer. For the production of lactic acid three factors are necessary: absence or marked reduction of HCl, great reduction of ferments, and motor insufficiency. In such cases histological examination shows disappearance of the specific glandular

elements in foci, the cells being replaced by cylindrical epithelium. The demonstration of the constant occurrence of the intense lactic-acid formation warrants the conclusion that total or partial atrophy of the peptic glands and motor insufficiency exist, a combination seen earlier and more frequently in gastric cancer than in any other condition."—*Archiv für Verdauungskrankheiten*, Bd. ii. H. 1 and 2.

Epidemic of Cowpox, with Infection of Milkmaids.—Dr. L. KAEMPFFER,

of Wenreuchen, reports an epidemic of cowpox. The disease first appeared in a cow that had been on the premises two years, without any discoverable source of infection. In a short time all but thirty out of ninety cows were affected. The pocks were only on the udders, from two to six on each teat, and being broken in milking did not follow the complete course, but became painful and sluggish ulcers. Sixteen milkmaids were engaged on the place, between the ages of sixteen and twenty-nine, all revaccinated. Ten of these acquired cowpox, without regard to the length of time after revaccination. The incubation in most cases was from three to four days; in two nine or ten days. General symptoms occurred only in cases with complications, such as phlegmon. In six cases there was only one pock in each; in the others two, three, five, and six, respectively. The pocks appeared especially on the flexor aspect of the fingers or the back of the hand, locations easily explained by the exposure of the hand in milking. The process of development of the pocks was practically the same as in vaccination, except that the time was shortened to twelve days and the cicatrices were not so deep. Experimental inoculations were not successful, the subjects ridding themselves of the vaccine.—*Deutsche med. Wochenschrift*, 1896, No. 50.

Amœburia.—The following cases are interesting in connection with the

obscure subject of hæmaturia :

WIJNHOFF (*Nederl. Tijdschr. u. Geneeskunde*, 1895, iii. p. 107) was consulted by a woman, aged thirty years, who passed bloody and purulent urine after attacks resembling those of renal colic. In the urine were numerous colorless bodies, identical with amœba coli. These amœbæ appeared after every attack of colic or strangury, but in the intervalss only encysted bodies and a few " ring-forms " were present. In three other cases amœburia occurred simultaneously with attacks of strangury and vesical or renal colic. In these cases the urine was cloudy and contained numerous pus-corpuscles. The formation of daughter-cells out of the large amœbæ could be observed. The protozoa were most numerous in the acme of the attacks, so that the author believes in an etiological relation between the parasites and the disease.

ZEEHUISEN, in abstracting this report (*Centralblatt für in. Med.*, 1896, No. 52), mentions a case he has seen, in which a medical student had an almost painless hæmaturia with numerous blood- and hæmoglobin-casts in the urine, and also numerous amœbæ. After the attack the ring-shaped amœbæ were still present.

Alimentary Albumosuria and its Value in the Diagnosis of Intestinal

Ulceration.—CHVOSTEK and STROMAYR (*Wiener klin. Wochenschrift*, 1896, No. 47) have made some investigations that promise valuable aid in the diag-

nosis of ulcers of the intestine. The experiments were based on the older observations regarding albumosuria (formerly called peptonuria) in ulcerative diseases of the intestinal canal. The authors concluded that the negative results in many of these cases were probably due to the fact that albumose was absorbed in quantities too small to be detected. They therefore gave to persons with various diseases comparatively large quantities of albumose, such as 40 to 60 grammes of peptone (*peptonum siccum*, Germ.) or somatose. Usually cases were selected in which there was no albumin in the urine, or at least no albumose. The urine was examined before the ingestion of the albumose, and at short intervals after, by the methods of Devoto and Salkowski. It was found that in the cases with ulceration of the intestine albumose could be detected; whereas in persons without ulceration, even large quantities of albumose could be taken without appearing in the urine. It is evident that in some cases of intestinal ulcer there may be temporary or permanent causes which prevent the absorption of the albumose, so that negative results cannot be looked on as proving the absence of ulcer. The cases now reported show the great value of the method, a diagnosis being made in several when there were no symptoms of ulcer, and confirmed post mortem. The subject offers an interesting field for control-investigations, for, as the author remarks, the number of cases they were able to examine was not enough to show all the possible results of such measures.

The Early Stage of Diabetes Mellitus.—M. Loeb (*Centralblatt für inn. Med.*, 1896, No. 47) calls attention to the fact, often overlooked, although the observation of almost any case of chronic diabetes should suggest it, viz., that in a large number of cases of diabetes small quantities of sugar may be found in the urine for long periods, sometimes years, before the excretion of larger quantities and the ordinary subjective symptoms are recognized. Loeb had occasion to make repeated examinations of the urine in a number of cases, including several hereditary diabetics, and so had the matter brought to his attention. As the author remarks, Prof. Ebstein considers all cases of protracted glycosuria diabetic. Loeb's article emphasizes the fact, well known but often neglected, that diabetes can be discovered earlier than otherwise if the urine of persons with even the most trifling symptoms be examined for glucose.

The Influence of Carlsbad Water on Metabolism.—V. Ludwig (*Centralblatt für innere Medicin*, Nos. 45 and 46, 1896) studied the effect of Carlsbad water on metabolism in two cases. The first experiment he carried out on himself and the second on a colleague. The diet was regulated for each according to the body-weight, and exactly the same amount of food taken each day throughout the experiment. The latter was divided into two periods, that before and that during the drinking of the Carlsbad water. The total nitrogen, chlorides, and phosphoric acid were estimated in the food ingested and in the urine and feces eliminated. In addition, the uric acid and alloxur bodies (uric acid and xanthin bases) were estimated in the urine. In four or five days, after a nitrogenous equilibrium had been established, each began to drink 1.5 litres of Carlsbad water daily. This was continued for nine and eight days respectively. Ludwig found that the water

had practically no effect on his own metabolism. In the case of his colleague there was an increase of 33.2 per cent. in the total amount of phosphoric acid eliminated, and the amount in the feces was increased at the expense of that eliminated in the urine. The alloxur bodies were slightly diminished in the urine during the water-period, whilst the amount of nitrogen eliminated in the feces was considerably increased. Ludwig attributes these changes not to any effect of the Carlsbad water on the organism, but to the fact that during the drinking of the water his colleague had suffered from diarrhœa. He does not believe that Carlsbad water itself rapidly produces a loss in body-weight, as is claimed for it, because his own weight and that of his colleague considerably increased while they were drinking it.

Kubisagari, an Endemic Paralytic Vertigo of Japan.—MIURA (*Mitteilungen der med. Fac. der Kaiserl.-Japan Univ. zu Tokio*, 1896, Bd. iii. No. 3) gives an admirable report on this disease, prevalent in northern Japan. It occurs especially in the warm season from May to October, in villages, among farm laborers of both sexes and all ages; comes on in paroxysms, and is characterized especially by the following symptoms: ptosis, dimness of vision, diplopia, hyperæmia of the optic papilla and its vicinity; motor disturbances of the tongue, lips, muscles of mastication, and rarely those of the gullet; paresis of the muscles of the neck, body, and extremities. Paresis of the neck-muscles and ocular symptoms are most common. There are at times change of disposition, increased-tendon reflexes, increase of the tears, nasal mucus, and at times the saliva. In the intervals the patients are either free from symptoms, or, if the attacks have been severe, have a mild degree of ptosis. This may be simulated by a conjunctivitis or trachoma, common among the subjects of the disease. Patients in whom the attacks are easily brought on, as by working in a stooping posture, may have weak neck-muscles, easily tested by having the head raised against a weight. A third symptom in the interval is increased tendon-reflex, never, however, so strong that ankle-clonus is present. In the intervals the patient complains of weakness and depression, loss of appetite, headache, etc.

Miura shows the points of resemblance of the disease under consideration with neurasthenia, Erb's asthenic bulbar paralysis, and Westphal's periodic or paroxysmal paralysis, as well as the essential differences. It most resembles, as he shows, the disease described by Gerlier, of Ferney, in 1886, under the name "vertige paralysant." This affection is epidemic in certain parts of Switzerland, Collex, near Ferney, being its chief seat. It is seen also in France. (Gerlier: "Une épidemie de Vertige paralysant." *Revue méd de la Suisse Romande*, 15 December, 1886, p. 769; 15 January, 1887, p. 5. Similar cases were reported from Switzerland by Dr. C. David, Dr. Haltenhoff, and others.) A number of case-histories quoted by Miura from the Swiss observers prove the identity claimed, though there are minor points of difference in the accounts of the Swiss authors among themselves as well as in these as compared with that of Miura. The latter gives an interesting account of the possible explanations of the chief symptoms. The most plausible explanation, he thinks, is an exaggerated tendency to fatigue on the part of the nerves and muscles. Localized fatigue is, of course, common in all occupations; the rice cultivator or the weeder has to strain his eyes,

hands, neck, back, and legs at the same time. In Japan and also in Switzerland the disease is attributed by the peasants to evil spirits. This explains why it was so long unknown to physicians, having been treated by charms, etc. The idea of a malarial affection was early entertained. Facts that throw some light on the real cause of the disease are as follows: farm laborers, especially those who work much with cattle and horses or who sleep in stables, are often affected, while well-to-do farmers escape. Dwellers in the city are rarely affected, or, if at all, those who work hard, as "jinrikisha" men. The disease occurs as a house-epidemic or sporadically, always in the warm season, or the change from warm to cold, or the reverse. Both in Switzerland and Japan the laborers work from early in the morning until night, with short pauses. The consumption of sour wine or beer seems to favor the development of the attacks. In Japan, as in Switzerland, the farmers live under the same roof with the live-stock, often without any partition. The stalls in these houses are rarely cleaned. Inheritance is supposed to be a factor; but, as Miura points out, all the patients are exposed to the same causes. "Kubisagari" houses are known, but infection from person to person is not observed. Pregnancy seems to check the attacks in some cases. Miura found no evidence of malaria in the blood in his cases, and no other blood-change. Inoculations and cultures could not be made, but an infectious agent can hardly be doubted.

As regards treatment, prophylaxis is most essential, the precise needs being stated in full by the author. General tonic treatment is useful.

A Peculiar Venous Phenomenon.—SCHLESINGER (*Wiener klin. Wochenschrift*, 1896, No. 52) describes in a preliminary communication a curious condition of the veins. This consists in a rigid contraction of the walls of the veins, coming on at times and disappearing again. In some cases the contraction could be brought on by cold, by massage, or by a mild faradic current. Heat caused the contraction to subside. An excised vein showed no abnormality of the walls or its nerves. All the patients who presented this phenomenon were men, seriously ill; but there was no apparent relation between the primary disease and the venous change. Phlebosclerosis can be distinguished from this condition by continued observation; thrombosis by demonstrating the filling of the vein. Prof. Weinlechner has often noticed a similar contraction in the veins in varicocele operations.

Absence of the Pupil-reflex in Hysteria.—KARPLUS (*Wiener klin. Wochenschrift*, 1896, No. 52) calls attention to the absence of the pupil-reflex in attacks of hysteria. Aside from an observation of Féré this does not seem to have been noticed before. Karplus's observations were made in the clinic of Prof. Krafft-Ebing, who confirmed the diagnosis and the fact of the absent reflex. The latter was also confirmed by the ophthalmologist Bernheim. The observations were made by having the lids held apart, the eye being illuminated by a hand-lamp and the cornea protected by salt-solution. Thus the eyes could be observed for many minutes. The pupils were wide open and motionless for as much as twenty seconds. These observations, if confirmed, will make it necessary to use with reserve the absent pupil-reflex as a negative pathognonomic sign in suspected hysteria.

Idiopathic Hemorrhage of the Kidney.—KLEMPERER has called attention to cases of hematuria in which cystoscopic examination shows that the blood comes from the kidney, but without other evidences of renal disease. He calls this " hemorrhage from healthy kidneys," believing in an analogy with the process in menstruation and vicarious menstruation. [In the latter process it is rather arbitrary to assume the organs are healthy, and even in the menstruating uterus, though it may be healthy, there is a process which can hardly be considered possible of imitation in a healthy kidney. Klemperer, however, has seen two cases of vicarious menstruation in the stomach, the organ in both cases being healthy.] Surgical literature contains accounts of healthy kidneys removed for hemorrhage, and Dr. Elbe has compiled these accounts in his thesis under Leyden's direction. The cases hitherto reported have been chronic, but Leyden has taught for years that there are acute cases. Two of the latter kind are mentioned by Klemperer. In one, an officer not accustomed to that exercise, took a long horseback-ride. On dismounting he passed black urine. In a few hours the color became lighter, but blood was passed for several days. The patient, after seven years, remains well. In the other case a bicyclist passed bloody urine after a long ride. The hemorrhage was not repeated. Chronic cases, as the result of hemophilia or of angioneurotic conditions, are rare. To the hitherto unique case of Senator, Klemperer adds two hemophilic cases and two of the angioneurotic variety. In the discussion following Klemperer's paper Nietze and Fürbringer called attention to the importance of time in the diagnosis of essential renal hemorrhage, as the symptoms of tumor other than hemorrhage may long remain latent.— *Münchener med. Wochenschrift*, 1896, No. 49.

Disease of the Spinal Cord in Whooping-cough.—BERNHARDT (*Deutsche med. Wochenschrift*, 1896, No. 50) reports the following rare case : a five-year-old girl, previously well, got whooping-cough. About the tenth day, immediately after a severe paroxysm of coughing, the extensors of the hip, knee, and ankle became contracted so that walking and standing were impossible. There was no fever and no sign of cerebral disease. The upper extremities were not affected. The knee-jerk was exaggerated ; there was strong contraction of the abductors of the thighs ; there was plantar flexion ; ankle-clonus was easily produced. There was no muscular atrophy. A month later Bernhardt found the conditions as described. There was hardly any voluntary motion in the legs. Sensibility to touch, temperature, and pain was lessened. There was no incontinence of urine or feces, but the expulsion of urine seemed somewhat feeble. A month later the patient could move the legs slightly and bend the knees, but spastic contraction and increased reflexes persisted. The general condition, aside from the moderate difficulty in urination, remained good. Improvement continued, so that in about five months from the beginning the child was able to walk. Six months later, after double parotitis, walking became difficult, and the spastic gait was plainly apparent. There was also difficulty in urinating. These symptoms again subsided. At present the patient is healthy, but has difficulty in urinating and at times rectal tenesmus. The feet have a tendency to turn in and the right leg becomes weak after a long walk. The treatment consisted in rest, warm baths, potassium iodide, and weak galvanic currents.

Bernhardt is inclined to ascribe the disease to an infectious myelitis of the lower dorsal and upper lumbar cord. The probability of a meningeal hemorrhage and of hæmatomyelia is discussed, and the analogies for a meningeal hemorrhage, such as hemorrhage from the ears in the scleræ and the skin in whooping-cough, are mentioned. Though cases like the one reported may recover spontaneously, the prognosis is not always good. A useful bibliography is appended to this interesting article.

SURGERY.

UNDER THE CHARGE OF

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Laparotomy and Suture for Gastric Ulcers.—MORSE (*British Medical Journal*, February 13, 1897) reports three cases of perforating gastric ulcer in which he performed laparotomy with suture of the stomach and a thorough washing out of the peritoneum. Two of the cases recovered. In both the operation was performed within five hours after the perforation had taken place. The operation consisted in an incision, three and one-half inches long, one inch to the left of the mediau line, commencing at the costal cartilage and extending downward toward the umbilicus. It was made to the left of the median line in order to allow the stomach to be more easily brought out. The perforation was closed by means of Lembert sutures, which penetrated the serous and muscular coats; two rows were inserted approximating areas of the stomach two inches wide. The peritoneal cavity was washed out with boiled water cooled to a temperature of 105° F., by the use of siphon-drainage and two long glass nozzles which were passed in all directions, thoroughly cleansing the cavity. There was considerable shock, which was treated by warmth and brandy enemata. Both patients made good recoveries and remained well, with no further sign of gastric ulcer. In the third case the patient died; she was not seen until twenty-four hours after perforation, and, although the same operation was performed, the patient recovered from the anæsthesia severely shocked, with a rapid, hardly perceptible pulse, rapid respiration, and low temperature. She lived only a few hours.

The author says: "The duration of life after perforation of the stomach may be estimated at twenty-four hours; hence the importance of early and distinct diagnosis cannot be exaggerated. The shock following perforation

is severe, and its effects can be observed to increase so rapidly that it is apparent the chances of success are diminishing in direct proportion to the length of time that is allowed to elapse between the occurrence of the injury and its repair by surgical means."

Intestinal Obstruction from an Impacted Gallstone; Recovery.—WILK-INSON (*British Medical Journal*, February 13, 1897) reports an interesting case in which intestinal obstruction was produced by a gallstone about the size of a pigeon's egg. The patient had all the usual symptoms of intestinal obstruction without, however, any localizing symptoms. Treatment consisted of copious and frequently repeated enemata of tepid water, alternating with nutrient injections and hypodermatic injections of morphine and atropine (gr. $\frac{1}{3}$ and $\frac{1}{140}$), to allay the excessive pain, a little ice being allowed for thirst. The pulse was 120 to 140, wiry, and occasionally intermittent; temperature 99° F. The tongue was dry and glazed, the abdomen tympanitic and distended, especially in the cæcal region. Nothing was discoverable on palpation and rectal examination. The patient continued in this condition, with some slight amelioration alternating with exacerbations, for eleven weeks, existing, upon the average, on not over three ounces of milk a day. At the end of that time the author was called suddenly to find his patient in a state of collapse, with great pain and straining. A hard mass was felt blocking the rectum; it was removed by pressure through the posterior vaginal wall, and proved to be a gallstone the size of a pigeon's egg, faceted and weighing ℥v gr. xliss. The patient recovered slowly, but completely.

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Chylous Cysts of Mesentery.—An interesting case of this rare form of cyst is reported by O'CONOR (*British Medical Journal*, February 13, 1897), the patient presenting the following symptoms when admitted: A distinct swelling was visible in the median line between the pubes and umbilicus. A well-defined, tense, fluctuating tumor was felt, even in contour, movable, and about the size of an ordinary cocoanut. Palpation caused severe pain, so that it was impossible to find the amount of motion. There was absolute dulness on percussion; no thrill was obtained. The tongue was furred, breath foul, temperature and urine normal; other organs healthy; the previous history showed nothing but chronic constipation and asthma.

The patient was anæsthetized and the tumor was found to move freely in all directions; an incision three inches long was made in the median line and directly over the tumor. A cyst presented, having a dirty green color and covered with enlarged veins, resembling a sarcoma. The tumor was lifted out with the mesentery and adherent intestines. The adhesions were so strong that it was impracticable to remove it; it was incised and the contents removed and the margins of the wound sutured to the abdominal parietes by continuous silk suture; the rest of the abdominal wound was closed. The cavity of the sac was packed and healed completely by granulation, the patient making a perfect recovery.

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Puerperal Septicæmia Treated by Antistreptococcus-serum, with Recovery.—A case of severe septicæmia occurring after confinement is reported

by Cummins (*British Medical Journal,* February 13, 1897); the pulse was quick and the abdomen distended, with a temperature of 103° F. The symptoms became rapidly worse and the temperature rose to 105° F. There were constant vomiting, delirium, hiccough, and a dry, brown tongue; the pulse-rate was 120 to 140. A dark, erysipelatous eruption appeared on the left mamma and spread rapidly over all the trunk. There was a severe rigor, with a rise of temperature to 106.6° F. in the axilla. She was apparently sinking when the injections were given.

The influence of the serum on what was an apparently hopeless case was most remarkable. The general symptoms—vomiting, hiccough, delirium— disappeared rapidly; not so the temperature, which continued a fluctuating course and did not come down finally until twelve days after the serum-injections had been discontinued. The influence of the treatment on the rash was most marked; four days after the first injection it had left the trunk and spread subsequently only two or three inches down the thighs and arms. Additional treatment adopted was quinine in large doses, perchloride of iron, hypodermatics of strychnine, salicin, stimulants, etc., with local antiseptic measures.

Diagnosis and Treatment of Neoplasms of the Liver.—The difficulty experienced in the diagnosis of tumors of the liver makes very valuable the additional knowledge which has been contributed to this subject by Tuf-fier (*Gaz. hebdom. de Méd. et de Chir.,* January 28, 1897).

It is impossible in many cases to make a diagnosis without an exploratory operation, and sometimes, with the tumor laid bare before the eyes, it is impossible to form a diagnosis without an exploratory puncture, which has too often proved fatal from the profuse and irrepressible hemorrhage which has resulted.

The author advises, in all cases of doubt, to explore the hilum of the liver to see if there are any enlarged glands present; if present, they show a metastasis from a malignant growth, and puncture is unnecessary; but their absence does not exclude a malignant growth, for if it is a secondary growth the metastasis would not be through the lymphatics, but through the venous channels, and the glands would not be enlarged. Primary cancer of the liver shows metastasis in the glands situated at the hilum. The presence of enlarged glands at this point is therefore in these cases of vast value as a diagnostic sign.

The question of hæmostasis in operations upon the kidney is one of great interest, and is especially so in cases of malignant growths. In the liver there is, in many cases, a marked dilatation of the veins and the tissues about them are friable, so that hæmostasis is very difficult and the means generally employed are of little value, as evidenced by many cases of fatal hemorrhage in operations upon this organ.

The author proposes, as a means of hæmostasis, the temporary digital compression of the pedicle of the liver. He has shown by experiments upon animals that this compression is capable of arresting a severe hemorrhage; and studies upon the cadaver have shown that it can be accomplished easily and safely without producing any damage in the human subject, although clinical experience alone can show how efficacious it will be.

The method of procedure is as follows: the left index-finger is introduced through the foramen of Winslow and compression made by the thumb of all the structures of the pedicle.

Iodoform-calomel in the Treatment of Wounds.—The results obtained in the treatment of wound-surfaces and cavities that are difficult to disinfect or from which it is difficult to eradicate completely a disease are detailed by Sprengel (*Cent. für Chir.*, February 6, 1897), who has found this combination especially efficacious in the treatment of tubercular wounds and in tracheotomies necessitated by diphtheritic membranes.

If this mixture is strewn upon a fresh wound-surface, after a short time it assumes a grayish appearance, undoubtedly due to an eschar produced by the caustic action of the drug. In a few days this will fall off and be followed by bright, healthy granulations.

A chemical analysis of the compound produced shows that the action of the wound-secretions forms a biniodide of mercury from the combination, which is a very powerful antiseptic.

The action of this salt of mercury is not the same if applied by itself, as poisoning may ensue, which does not when the two drugs are combined, as the soluble salt of mercury is only produced in proportion to the secretion of the wound.

The author applies the powder by shaking a curetteful into the wound and then rubbing it thoroughly about with a hæmostat covered by a ball of gauze. A previous thorough drying of the wound is necessary, which can usually be accomplished by packing the wound with sterilized gauze and letting it remain for a few minutes. The powder is then applied and the wound packed with gauze. The author finds that the removal of the packing is greatly facilitated by the slough which forms, as there are no adhesions of granulations to it and the patient has little or no pain when the gauze is removed three or four days later.

In tracheotomies the powder is strewn over the inner surface of the trachea, between the diseased area above and the wound and healthy tissue below. This procedure the author has found greatly hinders the spread of the disease and prevents infection of the wound. In 200 cases he has had 45 to 60 per cent. of recoveries.

The amount of powder employed varied with the case and the age of the patient. He has used a drachm of the mixture without seeing any serious results, and has employed suppositories and balls of the mixture in cocoa-butter in sinuses and cavities without seeing any harmful results.

Stone in the Bladder.—Keegan (*The Lancet*, January 30, 1897), in a table compiled from the Official Medical Reports published in India, shows that the mortality in 10,073 litholapaxies was 3.96 per cent.; in 7201 lateral lithotomies, 11.02 per cent.; and in 147 suprapubic lithotomies, 42.17 per cent.

The great decrease in the mortality after litholapaxy he attributes to an increasing skill in manipulation, citing the following series of cases as proof: In the first series there were 286 operations in males between fifteen and fifty years of age, with 11 deaths, a death-rate of 3.84 per cent.; 7 out of the 11 deaths occurred in the first 52 cases, or a death-rate of 13.4 per cent.; while

in the remaining 234 cases the mortality was only 1.7 per cent. In a similar manner, in a second series of another operator, of 676 operations in adult males, the mortality was 32 per cent.; in his first 111 operations his mortality was 14.4 per cent., while in the later 565 operations the percentage of mortality was 1.06 per cent. In still another series of 350 cases the mortality was 3 per cent. in the first 50 cases and only 1 per cent. in the last 300. These series of cases by eminent surgeons in India show that not until a surgeon has performed between 50 and 100 litholapaxies does his skill become so perfected that his best results are attained, and he would attribute the low mortality from litholapaxy in India not to a peculiarity of the Indian constitution, which enables them better to withstand the shock of operations, but to the greater proficiency in operating which the great number of cases afford the surgeon there; for even these surgeons, with the same class of patients, had a higher mortality in the first operations which they performed.

The author ascribes the falling off in the number of suprapubic lithotomies to the greater proficiency attained in litholapaxy and the power to crush large stones which the new lithotrites now have. He further advocates the perineal litholapaxy for stones that cannot be crushed by instruments passed *per urethram*. This operation is in general use in India and is giving very satisfactory results, as the injury to the prostate and contiguous structures is much less than where the stone is forcibly withdrawn through a larger incision.

The Disinfection of the Hands.—After a critical study of the literature on this subject and an exhaustive series of carefully conducted experiments, Fürbinger and Freyhan (*Deutsche med. Woch.*, February 4, 1897) conclude that the consensus of opinion and evidence shows that it is practically impossible to sterilize absolutely the hands with soap and water even in conjunction with ordinary antiseptics, but that sterilization is more nearly approached, *cæteris paribus*, the more alcohol is employed in the process.

The procedure advocated is the washing with warm water, soap, and brush for five minutes, rinsing in sterilized water, washing in alcohol for five minutes, washing in sterilized water, with or without a further washing in an ordinary antiseptic solution.

The action of the alcohol their experiments show to be threefold: 1. Its bactericidal action. 2. Through its properties of dissolving fats and mixing with water it prepares a way, not only for its own germicidal action, but also for that of any subsequent antiseptic. 3. It loosens the epidermis and with it the dirt and contained bacteria, washing them away.

Splenopexy.—Greiffenhagen (*Cent. für Chir.*, February 6, 1897) reports an interesting case which came to him with the history of a double nephrorrhaphy. Numerous silkworm-gut sutures were removed from the still ununited wounds, and upon the left side the author found a tumor which he diagnosticated as the pole of a floating kidney which had not been securely fastened in the former operation. The patient was caused much pain and discomfort by the presence and pressure exerted by this movable tumor, and he determined to operate again and fix the kidney in its proper position.

The depth of the wound did not, however, disclose the kidney, which a

digital examination showed to be fast, but in a position lower down than normal, while the floating tumor was found to be the spleen. The author determined to attempt to fix this in position by suture. Two long, stout silk sutures were passed through the parietal margins of the wound, through the peritoneum, and then deeply through the parenchyma of the spleen. Round curved needles were employed, and the bleeding, which in this case was not serious, was controlled by pressure. The peritoneal wound was then sutured and a final stitch passed between the former ones through the spleen; the parietal wound was then closed by deep sutures.

There was no suppuration; the wound healed kindly, with the exception of the discharge of one suture, which had cut its way through the parenchyma of the spleen. The patient recovered completely, the spleen retaining its normal position.

Intestinal Anastomosis by Suture.—The prevalence of the use of plates or buttons for the performance of anastomosis in intestinal operations makes prominent the results obtained by TAYLOR (*Birmingham Medical Review*, February, 1897) in two cases which he reports, where a double row of glover's sutures were employed in the performance of a lateral posterior gastro-enterostomy and an end-to-end intestinal anastomosis.

The intestinal anastomosis was performed for a tubercular tubular growth to the cæcum, which involved the entire coat and circumference of the bowel and caused stenosis, with recurring symptoms of intestinal obstruction and some of recurrent appendicitis. The entire growth was excised and the dilated ileum united to the lower proximal end of the ascending colon. The recovery was complete, with no sign as yet of returning tubercular disease.

The posterior gastroenterostomy was performed for pyloric stenosis in a case in which digital dilatation had been previously employed with a relief of symptoms extending over two years. The posterior opening was employed to prevent the accumulation of undigested food in the dilated stomach and give free exit to the food.

The method of operation was that described by Doyen, and consisted of a continuous glover's suture, which embraced all the coats of the intestine, the mucous the least, and united the cut margins of each wound to that of the other, forming a continuous mucous canal free from the scar-tissue which results after the sloughing out of a button and which occasionally gives rise to cicatricial contraction and stenosis. After the approximation of the edges of the wound by the first glover's suture, a second suture united the serous surfaces at a little distance from the wound.

The author believes that although the Murphy button and other similar means are useful in emergency cases, better results can be obtained in an operation *au froid* by the use of the suture, which he inserts with a round curved needle with no cutting-edge.

A Modification of the McBurney Incision for Appendectomy.—ELLIOT (*Boston Medical and Surgical Journal*, October 29, 1896) says there is no room for doubt that many dangerous and fatal operations for acute appendicitis can be avoided by the timely removal of an appendix which has shown symptoms of disease.

In recommending this operation, not only should the immediate mortality be considered, but all possible complications dependent thereon must be kept in view. The greater frequency of hernia after operations during acute attacks would be an additional reason for doing the operation between the attacks.

The author suggests the following modification of the McBurney incision, believing that it makes the danger of hernia much less.

He has done the operation by the McBurney incision ten times, and has been much pleased with it. When the appendix is in the normal position and is not difficult to get out, it is almost an ideal operation; but when difficulties arise and the incision has to be enlarged, it has certain serious objections. The first objection is that in difficult cases the necessarily constant and hard retraction of the muscles is apt to injure the tissue of the wound-surface so as to make its healing less perfect, and sometimes to cause suppuration. Another objection is that if it is necessary to enlarge the wound, not only is the advantage of the original McBurney incision lost, but we have a ragged and complicated wound with two muscular layers stripped widely apart. Such a wound is not well adapted to drainage if pus is unexpectedly found.

To meet these objections the author begins the operation by a longitudinal cut through the skin and the aponeurosis of the external oblique, beginning one-half inch inside the anterior superior spine of the ilium, and extending to the linea semilunaris. The fibres of the external oblique are thus cut across, but the fibres of the internal oblique and transversalis are separated as in the McBurney operation. In the author's operation the whole incision is a cross-cut, the external and internal incisions running in the same direction. There is no stripping of the external oblique. This incision can be readily enlarged upward or downward in the linea semilunaris, or may be extended into the rectus if necessary. He closes the wound by passing two rows of sutures through all the layers of the abdomen, to prevent a dead space, and unites the cut edges of the external oblique with a continuous buried silk suture.

Nine cases operated upon in this manner have given very satisfactory results; no nerves or muscles are cut, and there is no resulting anæsthesia of the skin. The aponeurosis of the external oblique has united well in every case, and the author sees no objection to cutting it.

Perforated Gastric Ulcer Treated by Operation.—BAKER (*Lancet*, December 5, 1896) gives an interesting detailed report of seven cases of operation for perforated gastric ulcer, with three recoveries. There was nothing particularly noteworthy in regard to the exciting cause of the perforation, but it was noted that those who had partaken of heavy meals just before the attack died, while those who had eaten but lightly recovered. In all cases the perforation was on the anterior wall of the stomach, the largest was only one-half inch across.

The operation was the same in all cases, a median incision above the umbilicus, with a transverse incision through the left rectus in three cases. In cleansing the peritoneal cavity dry sponges were used, the author believing that this method is in these cases much more rapid and better borne

by the patients than a long-continued flushing with the patient already in a collapsed condition. Particular care was used to carry the sponge between the liver and diaphragm, in order to wipe away lymph, fluid, and food, and to prevent the formation of a subphrenic abscess. The anterior wound was drained with strands of iodoform-gauze, one strand reaching deeply between the liver and the diaphragm on each side, another to the suture in the stomach, and a fourth down behind the gall-bladder. They remained *in situ* till the fifth or sixth day, when there was always some difficulty in removing them. The author believes them to be of great value, and thinks they do not interfere with the rapidity of the healing. In no case was the ulcer cut out. The edges were simply folded well in and the closing silk-stitches were deeply inserted in one or two rows by means of round sewing-needles.

In the after-treatment great reliance was placed on feeding by the mouth. Small, repeated doses of egg-albumin and water, beef-tea, of brandy and chicken-broth, were begun as soon as the patient had recovered from the anæsthetic. But besides this, peptonized suppositories were introduced into the rectum, alternating every two hours with five ounces of hot water.

The author believes that success or failure in these cases depends on the moment at which operation is undertaken after the perforation, and whether the stomach is filled with light liquid or solid contents and what has escaped through the perforation.

In the worst case, with much distention and shock, the condition of the patient began to improve after the incision and the escape of gas and fluid from the abdomen. This would lead the author to operate without waiting for recovery from the shock, and with the expectation that operative interference would tend to relieve it. He also notes that handling of the stomach is liable to produce violent vomiting.

The immediate after-feeding, the author believes, is not dangerous, as the stitches should not cut through for some days. The patient should be kept in bed after the operation and treated for gastric ulcer, and the general vicious condition of the digestion cured.

Massage and Movements in the Treatment of Fractures.—After an interesting discussion of this subject, DAVIS (*Annals of Surgery*, December, 1896) summarizes his views as follows:

"It is my belief that massage and passive motion are not used to the extent that they should be in the treatment of fractures; that immobility of the fractured ends favors quick union with little deformity; that there are some cases in which, owing either to peculiarities of the fracture or the impaired constitution of the individual, the tendency to the formation of callus is marked. Motion in these tends to the formation of exuberant callus and deformity. There are others in which bony union is unduly delayed; disturbance of the fractured ends in these hinders union. It is wise to wait until the fractured parts are glued together, usually eight or ten days, before attempting any except the lightest massage, and any extensive passive motion after that time should be used carefully but diligently. Passive motion and massage, when first attempted, should be of the most gentle character, and not so violent as to disturb the relation of the broken bones. Any marked pain and inflammatory reaction following passive motion and massage are

evidence that they have been too violent. The limb should receive massage and manipulation at each inspection or change of dressing, often daily. In some cases it is advisable to administer such massage as is possible without removing the splints. Persistent stiffness, particularly in fractures or injuries of the wrist, is often due to a rheumatoid affection locating itself in the injured region. Massage is valuable in the treatment of such, and should be given to that part of a limb beyond the seat of fracture to preserve it in a normal condition. Such dressings and methods of treatment should be adopted as will allow of the greatest use of massage, and passive and active movements consistent with proper retention of the fragments."

Osteoplastic Filling of Bone-defects.—AF SCHULTEN (*Arch. für klin. Chir.*, Band 52, Heft 1, 1896) reviews the different methods which have been heretofore employed in the treatment of bone-defects after sequestrotomy and losses of bone-tissue in the long bones. The ends to be obtained in these cases he enumerates as follows: (*a*) The form and body of the bone, and at the same time its strength, are to be maintained as near the normal as possible, while the defect is to be either filled up or evened over. (*b*) The wound and skin-margins are to be so nearly brought together that only a slight scar remains after the healing. (*c*) The operation of itself should not be so serious as to make the patient incur a great risk.

The author employs the following method to produce these results: after the sequestrum has been removed and the bone rendered free from all necrotic tissues, the lateral walls are cut free from the rest of the bone without destroying their attachment to the periosteum; then a sufficient amount of the remaining bone is removed on either side of the middle and posterior portion to provide periosteum which will enable the lateral walls to be brought together in the median line and united by sutures, and yet leave sufficient periosteum to cover the entire bone, with only one line of sutures. The same end is obtained by other osteoplastic modes of operating; for instance, only a portion of the lateral wall is preserved, the upper half being resected and left in contact with the periosteum, while the lower half is removed subperiosteally, and thus supplies the periosteum necessary to enable the upper portions of the lateral walls to unite in the median line and fill out the deficiency.

Near the epiphyseal lines the bones may be cut in wedge-shaped sections and slid toward each other to fill up a bone-defect in the middle third of the shaft. The osteoperiosteal flaps may be formed from one or both lateral walls as the individual case demands. The portions of bone are united together by metallic sutures or by strong silk, when the necessary tension is not too great. Care is needed in drilling the holes through the bone, and the author recommends for this purpose the use of the dental engine and drills.

The author never performs the osteoplastic operation on the same day on which he does the sequestrotomy, as he believes that great care must be taken to maintain the patient's strength, as these operations may become dangerous to the patient's life if due caution is not exercised.

The dressings used in such operations must not be compressive, as they retard the circulation and lessen the vitality and power to react and grow in the bones. After an operation in the tibia, for instance, he employs an occlusive dressing, but not compressive. The pads are laid above and below the

wound to support the splint; over the wound-area a sterilized wire gauze is placed, supported by the pads at either end to prevent pressure, and made occlusive by covering it outside with sterilized gauze. Hæmostasis is not secured by compressing-dressings and tight bandages, but before the dressing is put on the limb is elevated and moderate pressure made with gauze tampons, which suffice, after a short time, to still the bleeding. The elevated position is then continued for several days. The wound is dressed but once or twice for the removal of the stitches. The absence of pressure relieves the patient from pain, while the absence of dressing in immediate contact with the wound makes the dressing easy and free from pain to the patient. This dressing has also the advantage, as in many other dressings of this form, that while preventing irritation of the wound by the entrance of extraneous matter, it also prevents the irritation which arises from the contact of the dressings with the wound.

OPHTHALMOLOGY.

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Eucaine in Ophthalmic Practice.—BEST (Giessen) found that a 4 per cent. solution of the hydrochlorate of eucaine is to be preferred for anæsthetizing the cornea. At least four drops are necessary. The solution can be sterilized without decomposition, and may be kept sterile by the addition of formol. Burning pain follows the instillation of even weak solutions (1 per cent.), especially if corneal inflammation exists, and each fresh drop is painful, though to a less degree. There is decided congestion produced, both conjunctival and ciliary. The pupils of both eyes contract for several minutes (reflexly from the sensory irritation). The conjunctiva is not so sensitive as the cornea; it is only after the solution has reached the latter that the severe burning is experienced, for relief of which cocaine has to be employed. These unpleasant effects are, however, not so pronounced in all cases. The anæsthesia is pretty complete, though to a less degree than that produced by cocaine in like strength, and it occurs somewhat earlier (after about six minutes) and is of shorter duration (fifteen to twenty minutes).

Widening of the commissure and dilatation of the pupil are absent; but this is true to a certain degree only, so far as the pupil is concerned. While the usual quantity does not affect the pupil, larger amounts (ten to twelve

drops of a 4 per cent. solution) cause dilatation of 1 to 2 mm. in man. Animals of different species exhibit remarkable differences as regards the action of the drug upon the pupil. Dogs resemble men; rabbits showed only ½ to 1 mm. of dilatation; while guinea-pigs react to eucaine as to cocaine in this respect. The accommodation is not affected. Eucaine, like cocaine, causes opacity of the superficial layers of the cornea. Like cocaine, it diminishes tension slightly. An increased rate of diffusion from the conjunctival sac into the anterior chamber is caused by both—*e.g.*, the effects of pilocarpine or atropine occur earlier and last longer in eucanized eyes. Attention is called to a number of points of analogy between the effects of section of the trigeminus (permanent anæsthesia) and those after local anæsthetics (temporary anæsthesia).

Best concludes that while eucaine might be preferred in certain operations where dilatation of the pupil or ischæmia of the vessels is not desired, it will not displace cocaine on account of the pain it causes.—*Deutsche med. Wochenschrift*, vol. xxii. No. 36.

Rupture of the Iris from Contusion of the Eyeball.—GEORGE C. HARLAN (Philadelphia) finds that separation of the iris from its ciliary attachment, as the result of a blow upon the eye, is comparatively frequent, rupture of its pupillary border much more rare; rupture in the continuity of the membrane is rarest still, and he has not found record of a case of the radiating form of the latter. He reports six instances of pupillary rupture and two of radiating rupture in the continuity of the iris.

In the cases of rupture in continuity the edges of the small radial slits parallel to the iris-fibres tend to approximate, which makes them much more difficult to detect. They can be seen only by transmitted light; oblique illumination does not discover them.

As would be expected from the nature of the accident, when the iris is ruptured by contusion the eye usually suffers some other injury, such as more or less extensive intraocular hemorrhage, injury or dislocation of the lens, or, most frequently, rupture of the choroid.

In the five cases remaining under observation from four weeks to three years after the injury the mydriasis was permanent.

In two cases the accommodation was the same as in the sound eye, and in two it was only partially suspended. In the others it was not practicable to estimate it.

It is probable that ruptures of the iris from contusion, particularly small multiple ruptures of the sphincter, are much more common than is usually supposed. No doubt they have been the cause of the mydriasis in many cases that have been looked upon as paralytic. Harlan believes, however, that the paralytic form does occur as a result of contusion—a kind of peripheral stunning of the nerve-fibres which affects the accommodation equally with the pupil. These cases, however, yield quickly to the action of eserine, and would probably end in recovery in a little longer time without medication.—*Trans. Amer. Ophthalmol. Society*, 1896, p. 640.

Migrating Foreign Bodies within the Eye.—DE WECKER (Paris) reports two instances of the migration of foreign bodies from the deeper parts of the

eye into the anterior chamber. In the first case—a piece of copper—ten months had elapsed since its entrance; in the second—a chip of iron—six years. In the first case, during two attempts at extraction, the foreign body escaped into the posterior chamber, its probable original location, to reappear in a few days at the angle of the anterior chamber. The third attempt at extraction was successful, the reporter believes, because the cornea was opened at a point not, as had been done in the previous attempts, adjacent to the foreign body, but at a considerable distance from this, at the outer half of the horizontal diameter.

De Wecker concludes that a foreign body lodged in the deeper portions of the eye and causing no symptoms may make its way into the anterior chamber by migration, aided by the lymph-current, and a movement impressed upon it by its envelope of leucocytes, and upon its arrival there may set up severe symptoms. He quotes a case reported by Denig, who observed a piece of copper migrate from a point in the retina near the macula, where it had lodged over four years previously, forward and out of the eye through the cornea. The lens in this case had been removed shortly after the accident, having been penetrated and become cataractous.—*Le Progrès Méd.*, 3d series, No. 36.

The Diagnosis of Chalazion.—PANAS (Paris) calls attention to certain errors which may be made in the diagnosis of chalazion when accompanied by acute symptoms. It is to be differentiated from indurated chancre, hordeolum, and, if situated upon the upper lid, from inflammation of the palpebral portion of the lachrymal gland.

At the commissure, where the tumor reaches only a small size and is liable to be accompanied by swelling of the lids and chemosis, it may be mistaken for tenonitis. The chronic form is to be differentiated from gumma, tuberculosis, etc., of a Meibomian gland.—*Presse Méd.*, iv. ann., No. 104.

The Retinal Blood-stream at Death.—C. H. USHER (Aberdeen) reports a series of observations on the retinal circulation at the moment of death in man and the lower animals. The first change, noticeable from a few seconds to one or two minutes after the cessation of respiration, was that the blood-stream became granular in appearance and its flow visible. In the veins this flow continued in the normal direction from the disk; but in the arteries it later, in some cases, returned toward the disk. Afterward the blood-column became narrow, beaded, and broken up in the veins, and the arteries became empty. The granular appearance is probably due to a slowing of the circulation to such an extent as to allow red blood-corpuscles to become visible; and the narrowing of the veins and emptying of the arteries—the latter by return of the blood toward the heart—are the results of the intraocular tension.—*Ophthalmic Review*, December, 1896.

A New Method of Mounting Ophthalmic Specimens.—PRIESTLEY SMITH (Birmingham, Eng.), whose method of mounting in glycerin-jelly has been widely followed, points out that the use of glycerin-jelly as a means of mounting ophthalmic specimens has certain drawbacks. The steps by which the tissues are gradually impregnated with glycerin, in order to avoid shrinking,

are rather troublesome; the glycerin considerably lessens the sharp definition of the tissues by rendering them transparent, and the specimen when mounted is no longer available for microscopic sections, should such be desired. Moreover, it is by no means easy to obtain a perfectly transparent, colorless, and permanent jelly.

Formalin solution, which has proved such an excellent hardening agent, is also a good preservative. If it were possible to mount specimens permanently in this fluid, fixing and displaying them properly in an inverted jar, much time and trouble would be saved. Trials show that this can be done by means of a suitable glass jar, a perforated rubber bung, and a short glass rod which plugs the hole in the latter and holds the specimen in place.

The fluid employed is a 10 per cent. solution of formalin—*i. e.*, one part of "formalin" as sold in the shops to nine parts of water. That which is used for permanently mounting the specimens should be made with water which has been perfectly boiled and cooled, in order that it may contain no air. If this precaution be neglected, air-bubbles will soon make their appearance in the jar.

A jar is completely filled with de-aërated formalin solution; the half-eye is placed in it, the cut surface downward, without inclusion of air-bubbles; the bung, well wetted with the solution to prevent adhesion of air, is pushed firmly in, the fluid welling up though the hole; and, lastly, the hole being completely filled with fluid, the glass rod is pushed in until its inner end presses against the back of the specimen.—*Ophthalmic Review*, 1896, p. 4.

Ocular Manifestations of Gout.—WAGENMANN (Jena), before the Ophthalmological Congress at Heidelberg, called attention to the influence of gout upon the eye. The changes induced by this diathesis may consist in seroplastic inflammations, with or without perceptible excretion of uric acid. As examples he reports cases of scleritis, iridocyclitis with deposits between the choroid and retina, nodules within the sclera, and one typical instance of episcleritis periodica fugax. Moreover, gout may be the indirect cause of ocular affections, especially in consequence of certain vascular changes, particularly precocious atheroma. To this category belong cases of severe relapsing disease of the vitreous humor, which finally leads to cataract, detachment of the retina, and retinitis hemorrhagica. Certain sclerotising affections of the cornea come under the same head. Some cases of glaucoma exhibit a relationship to gout.

In the discussion Nieden agreed with the reader that relapsing opacities of the vitreous are especially characteristic of gout. Pflüger observed relapsing opacities of the vitreous, episcleritis fugax, and glaucoma in gout. Hirschberg witnessed a crystalline deposit in the neighborhood of the macula and also severe relapsing iritis. Alexander called attention to Snellen's observation that the bloodvessels of the eye may become obliterated by deposits of urates. Horstmann noticed ribbon-like opacities of the cornea in eyes otherwise healthy. Such an occurrence is strongly suggestive of a gouty origin.—*Deutsche med. Wochenschrift*, 1896, No. 36.

Treatment of Granular Ophthalmia.—R. H. ELLIOTT (Madras) says: in Madras trachoma is epidemic in certain months, and long after the original

epidemic has subsided the surgeon is still treating the disease. Where prompt and suitable treatment is adopted the majority of cases of trachoma are readily and quickly mastered.

For the condition in which the granules are small, discrete, and easily recognizable he prefers to use the actual cautery. The granules having been exposed by eversion of the lids, each granule in turn is burnt out with the actual cautery. The instrument commonly used is a slender, pointed, steel cautery, readily made or obtained from an instrument-maker. Two, at least, should be available, one being heated by an assistant while the other is in actual use. In operating upon adults cocaine is the best anæsthetic, but for children and very nervous patients chloroform must be used. No pain follows the operation, even in children.

In early cases pannus will disappear when the lid is cured, the yellow-oxide ointment being a valuable auxiliary in the treatment. In later cases, however, the condition is much more obstinate and calls for operation. He has obtained excellent results by free peritomy. In performing this operation care must be taken to remove not only the conjunctiva, but all the subconjunctival tissue right down to the sclerotic. This operation, when thoroughly performed, never fails to give benefit, even in the most obstinate cases. The after-reaction is often alarming, but Elliott has never seen any harmful results follow. Should some amount of pannus still remain after the subsidence of all signs of irritation, the circumcorneal ring of tissue may be carefully destroyed with the actual cautery.—*Indian Medical Gazette*, January, 1897.

The Treatment of Dermoid Tumors of the Orbit.—F. BULLER (Montreal) states that in the books extirpation is the prevailing idea, and that no other plan of treatment is suggested as suitable for all cases.

Total extirpation of small, superficially situated cysts is easy of execution and safe enough, but the larger growths that extend for an unknown depth within and even beyond the proper limits of the orbit may have extensive adherence to the walls of the orbit, to the ocular muscles, and even to the eyeball itself, complications which may entirely prohibit extirpation.

He has introduced a crystal of nitrate of silver as far back as possible into the sac, which was lightly plugged with sterilized gauze and the whole covered with a large pad of gauze soaked in a solution of perchloride of mercury.

Nitrate of silver was used instead of any other irritant because it is a potent antiseptic, self-limiting in its action, and sufficiently powerful to insure complete destruction of the epithelial lining of the cyst, and thus leave the whole surface in a suitable condition for complete adhesion and obliteration of the cavity. He has followed this plan of treatment in a number of cases, and always with perfect success.

Myles Standish (Boston) said, in these cases, he had used iodine on cotton to swab out the sac, packed it with cotton, and removed it on the following day without anything further.—*Trans. Amer. Ophthalmol. Soc.*, 1896, p. 687.

Blindness from Sphenoidal Diseases.—C. R. HOLMES (Cincinnati) points out that the septum of bone separating the sphenoidal sinus from the optic foramen is often extremely thin and sometimes incomplete, and that by extension of existing sphenoidal disease through this thinned wall many

cases of obscure retrobulbar neuritis develop, which may end in blindness. Through this same wall inflammation can extend to the nerves and vessels passing through the sphenoidal fissure, causing neuralgia of the ophthalmic branch of the fifth nerve.

He reports a case in which unrecognized empyema of the left sphenoidal sinus caused intense headache and total loss of sight in the left eye, light-perception being lost. The cavity was opened by a drill, through the anterior nares, and all pain of the eye and head entirely disappeared twelve hours after the operation. Light-perception returned and ultimately ability to read large type and tell time by a watch. On two occasions, the openings becoming obstructed, headache and impairment of vision occurred, which promptly disappeared when drainage was re-established.—*Archives of Ophthalmology*, vol. xxv. p. 460.

The Bandage in Cases of Heterophoria and Squint.—F. W. MARLOW (Syracuse) points out that the onset of convergent strabismus during the wearing of a bandage for injury or disease in childhood, or during any affection which temporarily prevents binocular vision, is not uncommonly observed. A considerable increase in the degree of heterophoria, and more especially an increased interval between the induced double images, are often observed when a bandage has been worn for two or three days after a tenotomy, which, at the time of operation, apparently corrected nearly the whole manifest error. Therefore the annulling of the binocular function by the total exclusion of one eye from vision for a few days would be likely to render manifest any latent heterophoria.

He is also inclined to attribute great importance to the immediate influence of the binocular function in establishing a perfect equilibrium after tenotomy while the tendon is more or less completely detached from the eyeball. This function compels the eye to occupy the position in which single vision is possible, and thereby helps to determine the point at which reattachment of the tendon shall take place. If, on the other hand, the eye is bandaged, it assumes its position of rest; there is no tension or straining of the tendinous fibres induced by the desire for binocular single vision, and the reattachment may take place at a point by no means the most favorable for that purpose.—*Ophthalmic Record*, 1897, p. 117.

OBSTETRICS.

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A Study of the Excretions of Parturient Women.—In the *Archiv für Gynäkologie*, 1896, Band lii. Heft 3, NEUMANN reports the results of his study regarding the excretions of parturient women. He first endeavored to

estimate the amount of soluble material voided in the urine by measuring the sulphates which it contains. His conclusions agreed in the main with Winckel's, and showed that the excretion of sulphates is lessened during the first ten days of the puerperal period, being inferior to that usually observed in a healthy adult. The reason for this is found in the fact that such material is voided in the lochia and to some extent by the formation of milk.

Neumann also endeavored to estimate the amount of fecal waste which such patients eject during this time. He found that, like the soluble material, less than normal is passed for the first ten days of the puerperal period. In one instance where the patient failed to have the bowels thoroughly emptied before labor a very great increase above the normal was noted. He calls attention from this to the practical necessity of having the rectum thoroughly empty before parturition begins.

The Prevention and Treatment of Puerperal Fever.—An elaborate and interesting paper under this title has been written by SAFT, one of the staff of the midwives' clinic at Breslau (*Archiv für Gynäkologie*, 1896, Band lii. Heft 3). He describes in detail the preliminary treatment of all patients who come into labor, which consists in thorough external cleansing. During a portion of the year patients are examined by pupil-midwives, whose hands are thoroughly cleansed under the supervision of the house-staff. Great care is taken to sterilize repeatedly nail-brushes and vessels used in cleansing the hands. No vaginal injections either before or after labor are given, except where a patient has been instrumentally delivered and has a foul lochia, when retained material is removed by a copious douche of $\frac{1}{2}$ per cent. lysol. Temperature is measured with great care by introducing a thermometer into the rectum. It is allowed to remain until the mercury ceases to rise, ten or fifteen minutes being often consumed in this observation. When patients have fever no antipyretics are given, nor is local treatment instituted. The diet is carefully ordered, acids and tonics are administered, and alcohol when necessary. This form of treatment has been in use since October 1, 1894. During this time 879 labors have occurred, 512 primiparæ, 367 multiparæ; 94 of these patients required instrumental help, making a percentage of operations of $10\frac{69}{100}$. All of the women normally delivered were discharged sound. Of the instrumental deliveries, one died from infection; one patient was admitted with a ruptured uterus, who did not survive abdominal section. The total mortality was 0.22 per cent. and the septic mortality 0.11 per cent.

The normal limit of puerperal temperature was placed at 38° C., and all cases in which the temperature exceeded this were considered to have fever. Omitting cases of bronchitis, pneumonia, enteritis, mastitis, and phlebitis of the lower extremities, the net morbidity was $24\frac{11}{100}$ per cent. It is noticeable that the morbidity was greater in those patients who were examined internally. The morbidity was least in those who were not examined internally and who had no artificial delivery and no douches. A careful study of those cases who were examined and those who were not examined leads to the conclusion that internal examinations conducted under strictly antiseptic precautions do not increase the mortality-rate of the clinic, although they do produce

more frequent cases of mild fever. On the other hand, high fever was three times as frequent with those who had been examined internally as with those who had not. An examination of the morbidity-rate shows that it was greatly increased by operative interference, and that the highest fever was observed in these cases. Those patients artificially delivered were obliged to remain longest in the hospital; next came those internally examined, but naturally delivered; while the convalescence of those who were neither examined nor operated upon was most speedy of all. The same holds true regarding freedom from permanent bad results.

The case which died of infection was one complicated by gonorrhœa; the pelvis was symmetrically contracted, and it was necessary to deliver the patient by forceps. The patient gradually developed an abscess in the pelvis which ruptured into the abdominal cavity, producing septic peritonitis. The child became infected, and died of sepsis beginning in an inflammation of the middle ear.

As a conclusion from these observations, Saft believes that prophylaxis against puerperal infection should consist in lessening internal examinations as greatly as possible, and in taking the greatest pains as regards antiseptic precautions in obstetric operations. He would entirely omit disinfection of the internal genital organs, even in cases where infection may occur.

In considering the treatment of septic infection, Saft compares temperature-charts from Leopold's clinic, in which active internal disinfection is practised, with charts of cases under his observation in which no local measures were employed, and in which the temperature fell to normal without interference. He is led to conclude that the treatment employed in other clinics is unnecessary, and possibly prolongs the fever. He also finds that in cases of pyosalpinx irrigation of the uterus should be absolutely forbidden because of the danger of infection in the uterine cavity. The same is true of acute inflammations of the tubes and ovaries, and no irrigation of the uterus should be begun without examining the uterine appendages, to determine their condition. From these observations Saft draws the conclusion that ordinary cases in private houses require no internal disinfection nor any internal treatment which exposes the patient to the risk of intrauterine infection.

[In view of the copious and energetic use of antiseptics which, a few years ago, characterized Continental clinics, the statements in the foregoing paper are certainly surprising; we observe that phlebitis of the lower extremity and mastitis are not counted as infectious, and no good reason is given for omitting them. We cannot agree with the writer in absolutely forbidding intrauterine treatment in septic infection; we have seen no harm, but rather decided good, follow the thorough cleansing of the infected uterus, provided this be done early in the case.—ED.]

Following the preceding paper, in the *Archiv für Gynäkologie*, 1896, Band lii. Heft 3, occurs a communication from BAUM, of Breslau, upon "Asepsis and Antisepsis in Obstetric Cases." He draws attention to the great discrepancy between the reports of various clinics, arising from the different methods of measuring temperature. He urges that the thermometer be inserted into the rectum, and that abundant time be given for the mercury to rise. He finds that normal patients who are not disturbed in any way

will at times have fever which never becomes dangerous, but spontaneously disappears. He believes this to be due to the fact that bacteria are always found in the vagina, but that they do not become virulent unless the tissues are extensively altered by either mechanical injury or by extraneous infection. As the most frequent source of injury to the tissues is interference, he would omit this whenever possible. His observations teach him that the hands of the practitioner are seldom thoroughly disinfected; it is easy to see, then, why infection should occur.

As regards the efficiency of different antiseptics, he lays great stress upon the use of alcohol, as bacteriological examination shows that when the hands are cleansed by this agent they are most often completely sterile. He finds, however, that in many cases the temperature rises for a short time above the normal line and spontaneously descends to the normal; this does not indicate infection, as there are many conditions which may cause a rise in the patient's temperature, and which are not septic.

Gastrohysterotomy for Highly Contracted Pelvis.—In the *Annales de Gynécologie*, February, 1897, PINARD and SEGOND report the case of a primipara, aged thirty-two years, who had a highly contracted and asymmetrical pelvis. Symphysiotomy was declined because of the peculiar contour of the pelvis and the condition of the birth-canal; when labor occurred the patient was delivered by abdominal incision, followed by the entire removal of the uterus. The operation lasted an hour. The method of operation consisted in ligating the vessels on one side of the uterus, separating the cervix from the vagina and then closing the vessels on the opposite side; the patient and the child made a good recovery.

Complete Retroflexion of the Pregnant Uterus at Term; Obstructed Labor; Total Abdominal Hysterectomy.—VARNIER and DELBET report a remarkable case of fibroma complicating pregnancy and retroflexion (*Annales de Gynécologie*, February, 1897). The patient had been married for twenty-three years, and had not been pregnant. The form of the tumor was such that a positive diagnosis could not be made. Pregnancy evidently existed, but the position of the child and the shape and size of the uterus were abnormal. On opening the abdomen it was found that the uterus was very strongly retroflexed into the pelvic cavity beneath the sacrum. It was raised with great difficulty, incised, and the child removed, the uterus being then completely extirpated. A curious feature of this case lay in the fact that the patient was entirely ignorant of the presence of the fibroma which blocked the pelvis, and also of the abnormal position of the uterus. She had no symptoms pointing to these conditions.

Etiology of Obstetrical Paralysis.—WALTON (*Boston Medical and Surgical Journal*, 1896, No. 26) has found, in dissecting the brachial plexus of the newborn infant, that the plexus is in close apposition to the sharp, inner edge of the clavicle. The suprascapular nerve leaves the plexus much higher up, passing outward and backward to the suprascapular notch. Walton believes that this nerve is independently stretched in the separation

of the head from the shoulder during birth, the distal point of fixation being the suprascapular notch or the outer edge of the suprascapular spine. It is observed that the muscles supplied below the spines of the scapulæ are most often injured; the rotation of the head, which brings the occiput under the pubes, brings the plexus forward against the clavicle also, shortening the distance from the emerging point of the plexus-roots from the spine and also the suprascapular notch.

So far as statistics are available they bear out what Walton has stated. The paralysis usually affects the arm upon the side opposite to that to which the occiput was directed during labor, in the first position, paralysis of the right arm being most often observed. As regards prophylaxis, Walton suggests that the second stage of labor be made as short as possible.

Uterine Fibroma Complicating Pregnancy, with Total Abdominal Hysterectomy.—In the *Annales de Gynécologie*, February, 1897, MONOD reports the case of a woman, aged thirty-nine years, several months pregnant and having a fibroma of the uterus. It was determined to remove the womb, which was done without special difficulty and a gauze drain left within the vagina. But little difficulty was experienced in the operation, the patient making a good recovery.

GYNECOLOGY.

UNDER THE CHARGE OF

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The Virulence of Pus from Diseased Adnexa.—KIEFER (*Centralblatt für Gynäkologie*, 1896, No. 52) affirms that in all cases of suppuration the life or death of the patient depends upon two factors—the degree of virulence of the pus and the power of resistance of the system. He made a bacteriological examination of pus from forty operative cases, in which recovery followed, in spite of soiling of the peritoneum during removal of the diseased adnexa. He attributes the low grade of virulence in old cases to the fact that encapsulated pus generally loses its infective quality in six months or a year, by overproducing its own toxins, though these may retain their virulent power for a longer period. Massage is therefore to be avoided. Purulent foci communicating with the bowel or vagina retain their virulence much longer.

Echinococcus of the Tubes.—DOLÉRIS (*Indépendance Méd.*, 1896, No. 22) reports the case of a multipara, aged thirty-six years, who had suffered with severe abdominal pain for eleven years. The diagnosis of uterine fibroid was made. On opening the abdomen a tumor was found extending above the umbilicus. It consisted of both Fallopian tubes enormously enlarged

and adherent to one another and to the omentum. They contained numerous echinococcus cysts. There were no metastases. The patient was cured.

The Relation between Menstruation and Erysipelas.—SALVY (*Gaz. hebdom. de Méd. et de Chirurgie*, 1896, No. 40), from a study of 810 cases, found a direct relation between menstruation and erysipelas in only 5.2 per cent. In 1.62 per cent. menstruation could be regarded as a direct etiological factor. In fifty-seven cases of recurrent erysipelas only three were due to menstruation. Erysipelas has no appreciable influence on the duration and amount of the flow. On the contrary, menstruation favors the development of erysipelas through its influence on the nervous system. Recurrences during the flow are due to the peculiar nervous state of the patient and to the persistence of colonies of streptococci in the skin and lymph-spaces, whose virulence has not been entirely destroyed.

The Treatment of Chlorosis with Ovarian Tissue.—SPILLMANN and ETIENNE (*Gaz. méd. de Paris*, 1896, No. 35), reasoning that, aside from their function of ovulation, the ovaries, through the medium of the menstrual blood, are the active agents in causing the excretion of certain organic toxins and also play an important *rôle* in the general nutrition, infer that since chlorosis is a disease of the ovaries, the functions of the latter ought to be restored by the incorporation of ovarian tissue. They administered to six chlorotic females the fresh ovaries of sheep, dried ovarian tissue, and fluid prepared according to Brown-Séquard's method. Unpleasant symptoms were noted at first, such as abdominal pains, headache, and muscular soreness, with sometimes a slight rise of temperature. In three cases the patients were much improved, the paleness disappeared, the number of red corpuscles increased, and menstruation reappeared. The remedy seemed to act like an antitoxin.

Technic of Alexander's Operation.—CALMANN (*Centralblatt für Gynäkologie*, 1897, No. 4) describes the following ingenious procedure: after drawing out the ligament as far as necessary on both sides, it is kept on the stretch by an assistant while two sutures of fine catgut are passed through it and through the pillar of the external ring on either side. Then sutures are passed on both sides through the aponeurosis, then through either half of the ligament parallel with its long axis, and out through the aponeurosis again near the point of entrance. When tied, these unite the ligament firmly to the aponeurosis without constricting the former. Finally the redundant portion of the ligament is excised and the distal end is sutured to the stump of the ligament. The wound in the skin is closed with a continuous catgut suture.

Examinations by the Brandt-Dührssen Method.—ADOLPHI (*St. Petersburger med. Wochenschrift*, 1896, No. 43) speaks highly of this method, which allows one to practise bimanual examination as thoroughly as if the patient were anæsthetized. The essential point is that the thighs should be strongly flexed as the woman lies upon her back, while the examining-finger is introduced under the left thigh, instead of between the thighs. The writer

employs a low couch, the head and foot of which can be raised by means of screws. The patient lies upon her back with her arms extended, her mouth being slightly open. The physician sits on her left side and places his right hand upon the abdomen, while the left forefinger is inserted into the vulva. If the abdominal muscles are not sufficiently relaxed, the patient is drawn downward and the thighs are flexed still more by raising the lower segment of the table. The symphysis and thorax are approximated and the recti are relaxed, thus favoring the most satisfactory practice of the bimanual.

Disturbances following Castration, and their Treatment with Ovarian Tissue.—LISSAC (*Gaz. hebdom. de Méd. et de Chirurgie*) reviews the various phenomena noted in women after castration, which are more severe in young, neurotic females than in normal subjects who are near the menopause. These are flushing, psychical symptoms, congestions and hemorrhages, disturbances of nutrition, and modifications of the sexual passion.

Flushing is a phenomenon which presents wide variations in regard to its appearance and severity. In some women it is noted only once a month, at the time when menstruation should occur; in others it may recur every half-hour or hour during the day or night. Sometimes the face alone is affected; sometimes the entire body seems to be congested and is covered with perspiration. The sensation of heat may be felt during sleep, the patient awaking in terror to find herself bathed in sweat. This symptom may persist for ten or fifteen years.

Among the reflex symptoms are headache, insomnia, neuralgia, cardiopathies, and muscular asthenia. Marked changes in the disposition are common, such as irritability, loss of memory, and mental depression, which may persist for many years. Insanity is noted in a certain proportion of cases of castration. Among the congestive phenomena are the irregular uterine hemorrhages and vicarious bleeding from various organs.

Increase in adipose has been generally observed, due to profound disturbance of nutrition of vasomotor origin and probable deficient oxidation. The apparent improvement in health as evidenced by increase in weight is often misleading. Sexual feelings are more or less changed in about one-half of the cases.

The effect of administration of ovarian extract upon women after castration has been to modify, in many instances, the before-mentioned disturbances. In sixteen cases thus treated by Jayle the flushing was more or less relieved, but returned after cessation of the treatment. Crude ovarian tissue and ovarin were given by the mouth, and ovarian liquid was injected hypodermatically. Ovarin was found to be most convenient, though it sometimes caused indigestion.

The first effect noted in the case of highly neurotic subjects was that the insomnia from which they all suffered was relieved. Cephalalgia was generally relieved or cured, and many psychical symptoms were ameliorated, especially mental depression. In one instance marked genital hyperaesthesia was notably relieved.

In four cases uterine hemorrhages ceased under treatment In general, nutrition was improved and the patients expressed themselves as feeling much better. But it must be admitted that the treatment should be continuous.

PÆDIATRICS.

UNDER THE CHARGE OF

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ASSISTED BY

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Treatment of Cholera Infantum by Subcutaneous Injections of Serum.
—REINACH (*Münchener medicinische Wochenschrift*, 1896, No. 18, p. 421)
reports the results of treatment in fifteen cases of grave cholera infantum,
in nurslings of from fifteen days to nine months of age, with subcutaneous
injections of horse-serum in doses of 10 to 20 cubic centimetres. The effect
of these injections, given usually in the evening, has been most remarkable.
Collapse disappeared; cyanosis gave place to normal color of the skin; the
extremities became warm, the pulse stronger, and the temperature was
raised. This improvement, which was noticed ordinarily six to seven hours
after the injection, was maintained on the following day; sometimes at the
end of twenty-four hours a relapse occurred, but this yielded permanently
to a second injection of serum.

In one case the injection caused a passing rise of temperature to 101.3°;
in three others there was albuminuria of short duration; in a fifth case,
fifteen days after injection, a generalized erythema appeared, lasting two days.

Of the fifteen infants so treated, four died, two of a concomitant broncho-
pneumonia and two of a follicular enteritis. All other medication was with-
held, and, aside from injections, the treatment consisted only of the regular
administration of rice-water.

Immunizing-injections of Serum in Diphtheria.—LÖHR (*Jahrbuch f.
Kinderheilk.*, Bd. xliii. S. 67) has studied the value of immunizing-injections
in hospital upon 254 children of ages varying from two months to fourteen
years, the observations covering a period of twenty-one months. The
strength of the serums varied from 100 to 3000 units, and the dose from 1
to 10 cubic centimetres.

In the beginning, when the injections were made only upon patients in
beds near to those which had been occupied by the diphtheritic patients,
four cases of infection occurred. When, however, the injections were made
upon all the patients of the ward, and, later, upon all patients subsequently
admitted, the disease did not reappear, except in three cases thirty to forty
days after injection, twice in children readmitted to the hospital, and once
with a child that had been discharged well and returned at the end of a
month with an attack of the disease. It is also noted that two children
admitted, but not injected on account of the gravity of their condition
(pleurisy, articular rheumatism), contracted diphtheria and one of them died.

The three cases of infection developing one month after prophylactic injection induced the author to repeat the injection monthly upon children who remained for any length of time in the hospital. After this plan was adopted no new case of diphtheria developed in the ward.

Another series of immunizing injections was made in the measles ward upon 99 children. Of this number there were twenty-one cases that died, all of them under one year of age; but in no case was there diphtheria or croup. Comparing this with previous statistics—those of Henoch, Rosenthal, and others, tabulated before the employment of prophylactic injections of serum —the relatively large number of deaths from croup or diphtheria (without bacteriological examination, however) is especially significant.

In the scarlatina pavilion, where, in the interval of twenty-one months, eleven cases out of 240 contracted diphtheria, the same results as in the ward were noticed. So long as only those in neighboring beds were immunized, diphtheria broke out from time to time, not to disappear definitely until prophylactic injections were made upon all new patients and repeated monthly upon those remaining in the ward. Of ninety-seven children who received immunizing injections, only one contracted diphtheria, twenty-one days after the last injection. The accidents of prophylactic serotherapy, in this author's experience, have been the same as those observed in cases of diphtheria treated by the serum. In no case were there grave complications, and such as occurred seemed to have no dependence upon the small or large quantity of serum used.

The Etiology of Tetany in Infants.—ROMME (*Gazette hebdomadaire de Médecine et de Chirurgie*, January 24, 1897, p. 73) presents a satisfactory review of the status of this interesting question, and, contrary to the claim of Kassowitz and his school that tetany is a manifestation of rhachitism, shows quite conclusively that this theory cannot be accepted. In regard to the three so-called cardinal signs of latent tetany—laryngospasm, Trousseau's sign, and the facialis phenomenon—Romme shows that these symptoms are only evidences of mechanical or reflex hyperexcitability of the cord and peripheral nerves, and the diversity of pathological conditions in which they are encountered indicates sufficiently the diversity of their causes. The absence of a precise etiology should therefore reserve the diagnosis of tetany for cases showing spontaneous characteristic contractions. In this respect tetany resembles epilepsy, the isolated clinical manifestations of which are not pathognomonic, but in their ensemble they give to epilepsy a nosological place. This analogy extends even to the pathological anatomy; the lesions found in tetany are very variable and diverse. Weiss, Bonome and Cervesato, and Szabo found a poliomyelitis of the cervical cord; others, as Tonnelier, Blondeau, Grisolle, and Trousseau, a hyperæmia of the brain and meninges; others, as Stasse, Niemeyer, and Schultz, a peripheral neuritis; while others, like Loos, have found only negative results in their autopsies. For tetany, as is the case for epilepsy, pathological anatomy furnishes no data that can be used in a study of the etiology or clinical course of this affection.

Catalepsy among Rhachitics.—EPSTEIN (*Revue Mensuelle des Maladies de l'Enfance*, January, 1897) reported to the German Society of Naturalists and

Physicians, at their meeting in September, 1896, his observation of cataleptic symptoms in eight rhachitics, aged from eighteen months to three and one-half years. These phenomena were manifested by the persistence of the position given to a limb. If, for example, the leg was raised, it was maintained in this position for a long time, often as long as fifteen to twenty minutes, in one case even as long as forty minutes, and then falling very slowly. If the position of the limb or parts of it was changed, even to a very uncomfortable attitude, the immobility would be maintained for an equal period of time. This phenomenon was more constant and distinct in the leg than in the arm. There was no tremor in the limb; during this cataleptic state the reflex excitability seemed diminished.

All of these children were rhachitic in a high degree. Aside from this condition, coupled with great feebleness, all these children presented a sort of arrest of intellectual development; they could not talk, or talked poorly for their age, and were quiet and apathetic. The general weakness and defective intellectual development in all these children, with a history in some of them of an acute disease (pneumonia), recall the cataleptiform states observed in adults after grave affections like typhoid fever (Bernheim).

Diagnosis between Diphtheritic and Pneumococcic Anginas.—JACCOUD (*Bulletin Médical*, September 13, 1896) believes diagnosis between these two forms of angina to be possible before bacteriological examination can be made. The onset of pneumococcic angina is very violent; in a few hours there are violent chill, severe pain in the throat, swelling of the glands, and a rise of temperature to at least 103° F. Locally, there may be membrane or not; when present, the exudation is grayish-white in color and adherent; when absent, the mucous membrane is red and glazed in appearance. The course of the temperature is characteristic; defervescence occurs suddenly on the fourth day. Albuminuria is sometimes observed, but is slight and of short duration.

In a word, the course is violent but benign, and there are no complications. The treatment is the application of glycerin with bichloride, 1 to 1000, after removal of the membrane, followed by boric-acid washings.

THE DUCTLESS GLANDS.

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Except it be in the kingdom of the antitoxins, there is no therapeutic realm in which, during the last two or three years, so much of interesting discussion and experiment has been going on as in that of the ductless glands. The first surprising discovery of the value of the thyroid body in practical medicine has been so far confirmed and corrected by continuing experience that as a drug the gland rests upon a firm foundation of knowledge. We now know that it is a very useful remedy in the treatment of myxœdema; that it is often of great service in those forms of obesity in which there is a tendency to general softness and flabbiness of tissue and to lack of proper development of the blood; in other words, in the so-called "fat anæmics" of some writers. In insanity the records are, on the whole, records of failure rather than of success, and though in some instances of melancholia and other chronic insanities good is alleged to have been achieved, in general little is to be expected; if in any case of insanity the practitioner determines to essay the use of the thyroid extract, it is essential that the bodily weight be carefully watched and that the remedy be suspended the moment it begins distinctly to fall or cardiac weakness and rapidity of heart-action or breathlessness develop. In skin-diseases good results have been sometimes achieved, especially in cases in which there is large development of tissue of a low type, as in keloid, hypertrophied cicatrix, and sometimes in chronic eczema with great thickening of tissue; but here, again, the drug often fails us.

A very important observation is that of Dr. R. Lépine, who has reported a case of progressive myopathy in which the subject, a day-laborer, came into the hospital entirely incapacitated for work by the widespread muscular change. About 900 grains a day of the fresh thyroid gland were given him for a number of weeks; at the end of that time the improvement had been so great that the man refused to stay longer in the hospital, asserting that he was entirely able to do his work. It was noted that those muscles which had undergone complete change did not seem to be distinctly affected, but that the process appeared to have been arrested and great improvement to have taken place in the fibres of those muscles which were in the incipiency of change. It seems also well established that in the true goitre of Switzerland and other mountain countries, if the thyroid be given before calcareous degeneration has taken place, it will bring about absorption of the overgrown gland—a result which strongly contrasts with the fact that the thyroid extract usually greatly aggravates the symptoms of exophthalmic goitre, in which disease it has marked capabilities for harm rather than for good.

The loss of weight which is so often produced by the ingestion of thyroid gland or its preparations strongly indicates that that body increases tissue-waste; and the early experiments of Mendel, of Napier, of Ord, and others were concordant in showing that there is under the influence of the thyroid extract an increase in the output of urea It is true that Vermehren affirms that this increase occurs only in myxœdematous subjects and in those of advanced age, no young people in his experiments having been affected; whilst Paul Mayer failed to get any evidence of increased nitrogenous waste after the exhibition of thyroidin. On the other hand, however, Bleibtren and Vendelstadt found in an individual case that one-sixth part of the loss of weight could be accounted for by the increased elimination of nitrogenous material, while the other five-sixths was the result of the destruction of the fat and other carbohydrates; while Irsai, Vas, and Gara, in several goitrous individuals, determined that the loss of weight was accompanied by an increase in the elimination of nitrogen, phosphorus, sodium chloride, and uric acid; and in the experiments upon dogs Roos, Burger, Scholz, and Treupel have all noticed pronounced and continuing increase in the elimination of nitrogen and of phosphorus. Curiously, the elimination of chlorine has usually been at first increased, afterward lessened.

These various researches are sufficient in extent to warrant a definite conclusion, and it would appear, therefore, that the thyroid and its preparations lessen the bodily weight in part by causing a destruction of the nitrogenous tissues, but still more largely by wasting the carbohydrates of the body.

The question as to the nature of the active principle of the thyroid

body is at present one of very great interest, to which a partial answer can be given.

In 1895 Baumann announced that the physiological activity of the thyroid gland depended upon the presence of a proteid substance containing iodine, to which he gave the name of thyroiodin; a year later Gottlieb found in a series of experiments that while he could maintain the life of dogs which had suffered thyroidectomy by feeding them on the thyroid gland or giving them thyroid extract, the thyroiodin was incapable of preserving the animal's existence. The contrary result, however, reached in the experiments of Hildebrandt and of Notkin, confirmed by the experimental and clinical evidence gathered together by E. Roos, Arthur Hennig, Treubel, Ewald, Levy, and others, confirm the statements of Baumann and seem to prove that the thyroiodin is the chief active principle of the thyroid body; but that while it is capable of saving the life after thyroidectomy, it does not put an end to the tetanoid symptoms which are often so prominent in the dog after removal of the gland, and that therefore there must be in the thyroid body some second active substance. It is possible that this second substance is the thyreo-antitoxin of Fränkel, although there is at present no proof of this, and the researches of Robert Hutchison would seem to indicate that thyreo-antitoxin is inert.

In regard to the method of administration, thyroiodin is scarcely a commercial product. Thyroidin of Merck's *Index* and of the German writers is nothing more than the dried thyroid gland of the ox. It certainly is efficient, and, as the dose is only 5 grains, can be used in capsules, three to five doses in the twenty-four hours. If in any case the symptoms of thyroidism—*i. e.*, nervousness, shortness of breath, rapid pulse, or other physiological symptoms—appear, the daily dose should be reduced.

THYMUS GLAND. Concerning the medical value of the *thymus gland* we have little or no knowledge, except that the first statements as to its value in exophthalmic goitre have not been borne out by more recent clinical studies, as was especially shown by Mr. Hector Mackenzie in the elaborate paper published in this JOURNAL not long since.

PITUITARY BODIES. The fact that the *pituitary body* is often diseased in cases of acromegaly naturally suggests that it belongs to the ductless glands and has widespread relations to the general nutrition which might be availed of in the treatment of disease. On the other hand, however, so many cases of acromegaly without recognizable disease of the pituitary gland, and so many cases of disease of the pituitary gland without acromegaly, have been reported, that at present it is very doubtful whether the connection between this body and acromegaly is ever anything more than an accidental coincidence. There is at present no clinical evidence that the pituitary body has therapeutic value; but

it is interesting to note that the experiments of Oliver and Schäfer indicate that there is similarity or resemblance of function between it and the suprarenal capsules, at least in so far that its extract, when given intravenously to the dog, like that of the suprarenal capsule, produces a rise of the blood-pressure, which Oliver and Schäfer believe that they have shown to be the outcome of contraction of the arterioles.

SUPRARENAL CAPSULES. During the last year or two much work has been performed for the determination of the function of the suprarenal capsules and of their possible use in therapeutics. It is not yet settled whether or not they contain a true active principle, much less what that active principle is. They certainly contain some toxic substance, but the question now pressing for solution is: Is this toxic principle produced by the gland or is it only filtered, as it were, out of the blood and accumulated in the gland?

It seems established that the adrenal bodies contain a considerable amount of neurin, and that this substance appears in the urine of patients suffering from Addison's disease. Two views not necessarily antagonistic or incompatible have been held about this matter; one that of Marino-Zuco and Guarnceri, that the active toxic agent of the gland is neurin; the other that of Albanèse, who believes that the function of the gland is to destroy or overcome the poisonous effects of neurin. The latter view has been especially combated by E. Boinet, but is not improbable.

The theory of the English physiologists Oliver and Schäfer is that the glands produce a substance which maintains muscular tonus, while that of E. Dubois, resembling that of Albanèse, is that they destroy toxic principles originating in the body, especially those resulting from muscular work. At present the theory that the chief function of the adrenals is to destroy poisonous principles produced in the economy seems the most probable, since it receives confirmation from the experiments of Boinet, that the muscles, blood, etc., of rats from which the capsules have been exsected contain a toxic substance, as well as from the discoveries of Charrin and Langlois that the suprarenal capsule triturated with nicotine lessens its poisonous power; and that injections of the capsule diminish the action of atropine in the living dog. The activity of the capsules is lessened or altogether destroyed by disease, the swollen, inflamed capsule of diphtheria being entirely inert. According to Langlois, there is a direct relation between the activity of a suprarenal capsule and its power to strike a blue color with the perchloride of iron.

The intravenous injection of minute doses of the suprarenal capsule is followed in the dog by a great rise of blood-pressure, which the experiments of Oliver and Schäfer apparently prove to be due to a contraction of the arterioles, caused by a direct action of the poison upon their

muscular coats. Using the oncometer or plethysmograph, they found that there was always a contraction of the limb, the spleen, the kidney, or other organ enclosed, amounting from 20 to 25 per cent., directly after the intravenous injection of the extract; the contraction being entirely independent of the nervous system. The rise of pressure was accompanied by slowing of the heart-action, which was due to a stimulation of the vagi, believed to be centric, and was prevented by previous use of atropine or by section of the vagi. It would appear also, from these experiments, as though the heart itself was markedly energized by the extract, since the rise of the blood-pressure after section of the vagi—that is, after putting aside the stimulation of the inhibitory apparatus of the heart by the extract—was often double what it had been during the period of slow cardiac action.

Although the reputation of Schäfer makes it exceedingly improbable that there is any inaccuracy in his work, it must be acknowledged that there is distinct contradiction as to fact between the English and Polish physiologists. Szymonowicz and Cybulski affirm, first, that after section of the cord the extract is incapable of producing rise of blood-pressure; second, that the circulatory and respiratory changes produced in the normal animal by deprivation of oxygen do not occur in animals whose suprarenal capsules have been removed a few hours previously. Oliver and Schäfer, as the result of their experiments, deny the correctness of each of these statements. They believe that the results obtained by Cybulski (second statement) were due to the remaining presence of shock from the operation. An important observation by Cybulski is that the blood of the suprarenal vein contains a notable amount of the toxic principle of the gland.

Toxic doses of the extract cause, in the frog, progressively increasing loss of power without a true paralysis, and death apparently through an asthenic failure of respiration; in mammals a rapid and extreme enfeeblement, with failure of respiration and also of the circulation, consciousness being preserved very late in the poisoning. The death is apparently by asthenic failure of respiration, though when this function is artificially maintained there is finally loss of heart-power, with paralysis of the vagi nerve (Gourfein). No lesion except pulmonary congestion has been discovered after death. Gourfein, Oliver, and Schäfer find that the nerve-trunks and muscles preserve their activity to the end, so that the loss of power is not of peripheral origin.

It is evident that in the present state of our knowledge the only use of the suprarenal capsules in medicine which can be considered to rest upon the foundation of scientific rationalism is in Addison's disease. If, however, as is probable, Oliver and Schäfer are correct in their physiological conclusion, that some principle produced by the suprarenal capsule is the most powerful local known substance as a stimu-

lant to the muscle-walls of the arterioles, it is possible that future ex-
perience may show that the suggestions of Dr. Oliver have practical
value. These suggestions are that the suprarenal capsules will be use-
ful in all forms of asthenia and anæmia in which there is very great
loss of the general vasomotor tone. It is also claimed by Dr. Oliver
that in anæmia there is sometimes a sharp rise in the percentage of
hæmoglobin during suprarenal treatment, although it seems as yet
entirely uncertain whether this ever occurs in those fatal anæmias
which are grouped under the name of pernicious anæmias. The pro-
found anæmia of Addison's disease would, however, seem to indicate
that possibly the suprarenal capsules may have some relations with the
blood-making organs. Dr. Oliver's trials with it in diabetes mellitus
and diabetes insipidus do not appear to me to indicate that the drug
has any value in these affections.

It is clear, also, that Addison's disease, so-called, is not probably a
single disease, but a group of diseases. Cancerous destruction of the
suprarenal capsule may well lead to the same symptoms, so far as the
general system is concerned, as does tuberculous destruction of the
glands. In any individual case of Addison's disease, therefore, the
ultimate value of the treatment must depend upon the nature of the
suprarenal lesion, whether it be one capable of invading the surround-
ing region and finally killing entirely, independently of any function of
the suprarenal; or whether it be the expression of a widespread systemic
vice, which shall manifest itself by-and-by in other parts of the body;
or whether it be a simple change in the glands themselves, like a scle-
rosis, local in its character, of no significance save only as it affects the
functions of the gland. It is plain that the suprarenal treatment of
Addison's disease only supplies the loss to the body of the functional
activity of the glands, and that it can have no effect upon the local
lesion in the gland or upon a systemic vice which has produced that
local lesion.

In regard to the dosage and method of administration it should be
noted that the suprarenal gland appears to be a very active body.
According to Oliver, it loses about four-fifths of its weight in drying,
so that the so-called "extracts of dried gland" represent five times its
weight of the fresh gland. Oliver and Schäfer found that of this
extract 0.0037 gramme would produce the maximum effect in ele-
vating the arterial pressure in a dog weighing 10 kilogrammes. In
my case a glycerin extract, representing 40 grains of the gland to the
fluidrachm, was used hypodermatically once a day, in doses of 10 to 15
minims; and later in dose of 20 minims by the stomach. Oliver puts
the dose of the extract as 3 to 5 grains, preferably given in tabular
form three times a day.

So far we have no knowledge of any systemic condition produced

by exhibiting the gland freely, parallel to thyroidism which is interesting in the face of the fact that Oliver has given 120 grains of the dried (600 grains of the fresh) gland daily for a week. The suprarenal capsules are so apt to be imbedded in fat, and so hard to find, that one is inclined to doubt whether Oliver's extract was made from the pure gland. Certainly always, in making the extract, great care should be taken to see that the capsules are themselves used, and well cleansed before using.

SPLEEN. The enlargement of the spleen which occurs in myxœdema, cretinism, and after excision of the thyroid body, naturally suggests that there is a relation between the two organs, although we have no light as to the nature of the relation and whether the splenic enlargement is due to an attempt at functional replacement of the exsected or diseased thyroid, or whether it is the outcome of irritation by the presence of materials in the blood which should have been removed by the thyroid gland; or, indeed, whether it be not the result of an irritation produced by the absence of some principle made in the thyroid whose presence is necessary to the healthful life of the spleen. I am not aware that there has been any investigation as to the result of feeding the lower animals exclusively upon spleens; but the discovery of Oliver and Schäfer that the intravenous injection of the splenic extract into the dog causes an immediate fall of the arterial pressure, followed by a pronounced and continuing rise, shows that the extract is not an inert body. In a case of severe chronic exophthalmic goitre which was under my care some years ago an acute splenitis developed in a manner which was altogether inexplicable; no cause for the attack could be made out. Deep in the parenchyma of the organ there was formed an abscess whose opening and discharge were, after many months of severe sepsis and desperate illness, followed by return to health. In the second or third week of the splenitis the enlarged thyroid began to diminish, and in a short time regained the normal size. The result was a permanent cure of the exophthalmic goitre, no symptoms of the disease returning.

This case, and the reflections it gave rise to, led me to try the splenic extract in various cases of exophthalmic goitre. I have found that two practical difficulties attend its administration. If it be given by the mouth in sufficiently large doses to produce effect, it is very apt to derange violently the digestion and to cause much pain, nausea, and even vomiting; effects which, considering the small amount of material taken, are marked evidences that it is not an inert body. If the splenic extract be given hypodermatically, it very frequently causes great local irritation and even abscesses.

Obviously, it is somewhat difficult to get patients who are not under complete control to make thorough trial of splenic medication. In my dispensary service in the University of Pennsylvania in some cases there

has been a distinct amelioration of the exophthalmic goitre under the influence of the remedy, but in the majority of cases the results have not been satisfactory; and in no case, so far as I know, has a cure been obtained. In these people, however, the home surroundings and circumstances are usually so inimical that any treatment has to be carried out in the face of all obstacles. Moreover, it is impossible to know whether a disagreeable, more or less repulsive medicine is taken regularly. In the University Hospital I have had one case in which, after some weeks of treatment, the patient insisted that she had entirely recovered and refused to stay longer, although there was still some remaining enlargement of the thyroid. In the case of Mrs. ——, in private practice, the disease was of six years' duration; the exophthalmus was very pronounced; the action of the heart so extremely rapid and irregular that it was almost impossible to count the pulse, which was noted, however, as being about 180. The enlargement of the thyroid was very great. The breathlessness was marked, and the general nervous erethism such that the woman was on the verge of insanity. To this patient was given by the mouth immediately a teaspoonful of the glycerin extract of spleen, made in the ordinary manner; it produced at once violent gastric distress accompanied with local pain radiating from the stomach, lasting for some hours, and followed by complete disgust for food. After a few days the dose was again exhibited, and later again, each time with similar result. Following this 10 minims were injected twice a day hypodermatically into different portions of the body; they produced much local pain and hardening of tissue, but in no case was there finally abscess; whenever the local symptoms would get intolerable the injections were temporarily stopped for a few days, small doses of the extract being given by the mouth. This was kept up for six months, when 10 drops of the spleen-extract with 10 drops of digitalis were administered three times a day. (It should be noted that early in the case digitalis and all the ordinary treatment for exophthalmic goitre had been tried without result.)

The improvement in this case began not a great while after the commencement of the hypodermatic injections, and has continued, so that today the enlargement of the thyroid gland has entirely disappeared. The general nervousness has also gone, so that the patient is hardly more neurotic than before the attack. The exophthalmus is less, though still apparent, and the cardiac action greatly reduced, though the heart remains irritable on excitement. Before the treatment the breathlessness was so extreme that the patient was not able to walk in the street at all; now she walks comfortably for a long distance, provided there be no attempt at a very brisk pace.

In the course of thirty-five years of practice I have seen a great many cases of exophthalmic goitre, and, though I have frequently wit-

nessed relief as the result of prolonged rest and residence by the sea-shore, I have never before seen a case in which the thyroid body greatly diminished. All the usual remedies, drugs, galvanism, etc., have in my hands proved remarkably ineffectual, so that the results reached in the two cases here narrated seem to me sufficient to demand very careful, persistent trial of the splenic extract in exophthalmic goitre.

In using the extract of any of the ductless glands it must always be remembered that, if any good is achieved, it is probably the result of an addition of certain substances to the body which are normally formed in the body in sufficient quantity for its needs, but which, through accident or disease, the system has failed to supply itself with. It follows that there are usually two stages in the treatment of such a case; the first, in which the material must be given largely to put an end to the results of its long-continued absence; the second, in which the substance must be given in small doses to maintain the balance of function which has been restored. Thus, in myxœdema for the first months or years thyroid extract should be given in as large a dose as the patient can bear it; afterward, when the myxœdematous condition has subsided, the gland must be given continually in small doses, probably during the whole life.

UNIVERSITY OF PENNSYLVANIA, March 31, 1897.

THE SURGICAL TREATMENT OF APPENDICITIS.[1]

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In studying the statistics of these sixty-nine cases it should be borne in mind that the majority of the patients were brought to the hospital by ambulance, many of them being desperately ill. As a rule, the ambulance was summoned as a last resort, after medical treatment had been employed for days or even weeks; indeed, several of the patients were sent to the hospital by their friends merely for purposes of eu-thanasia. With the exception of the chronic relapsing and recurrent cases, most of them were in an unfavorable state for surgical inter-ference. This may be in part explained by the length of time inter-vening between the beginning of the symptoms and their arrival at the

hospital. The average of this in the acute cases was nine days, the shortest time being twenty-four hours, the longest seven weeks. During the past year it has been quite noticeable that patients have been sent to the hospital at an earlier stage of the disease than was formerly the custom. Not only physicians, but the public also—in this city, at least —are beginning to realize the importance of early operation, or at least of placing the patient in a position where an operation can be promptly done should serious symptoms develop.

The cases (69 in number) are divided as follows :

Acute appendicitis, first attack	32
Chronic recurrent appendicitis	21
Chronic relapsing appendicitis	16
	69

SEX, AGE, AND OCCUPATION. Of the 69 cases there were

Males	36
Females	33
	69

Under 20 years	19
20 to 30 "	32
30 " 40 "	10
40 " 50 "	8
	69

The youngest patient was 5 years of age.
The oldest patient was 50 " " "

In regard to occupation there were

Of sedentary occupation (school-teachers, students, clerks)	20
Of laborious occupation (laborers, printers, servants, etc.)	35
Of no given occupation[1]	14
	69

SYMPTOMS. *Pain (character, history, and location).* This symptom has varied in severity from mild to severe. In one case (34) only was it of such a character or of such a severity as to suggest an acute attack of biliary or renal colic. Still, the possibility of a gallstone impacted in one of the ducts was borne in mind in several patients where the pain was referred high up on the right side. Case 34 is of interest in this connection. The patient, a woman aged forty-five years, complained for years of occasional pain in her right side, running up toward the liver. It had been supposed to be due to a movable kidney, and a nephrorrhaphy had been done in a hospital in this city in January,

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[1] The majority of these were " housewives," and should probably be classed more properly under those of laborious occupation.

1895. No benefit was derived from this operation, the attacks of pain continuing as before. The kidney, which as the result of the nephror-rhaphy was in an advanced stage of parenchymatous inflammation, was afterward removed, but in spite of this the pain continued. In February, 1896, the abdomen was opened and an enormous appendix was found, eight inches in length, turned directly upward behind the colon and plastered by lymph to its posterior surface. At the same time several gallstones were removed from the gall-bladder. Since this operation the pain has entirely disappeared.

As to the location of the pain, it was as follows:

Beginning in and remaining localized in the right iliac fossa . 32
    "   in epigastrium and shifting to the right iliac fossa . 4
    "   as general abdominal pain and later shifting to the
                right iliac fossa   10
General throughout   8
Beginning in hypogastrium, then becoming general .   .   . 3
    "   in hypogastrium, then shifting to right iliac fossa . 2
    "   in hypochondrium, then shifting to right iliac fossa . 2
    "   in umbilical region, then shifting to right iliac fossa 2
    "   in umbilical region, then shifting to right inguinal . 1
    "   in right inguinal region, then general   .   .   . 2
    "   in right lumbar region, then right inguinal   .   . 1
Confined to whole right side throughout   1
Doubtful   1
                                                            ——
                                                            69

No deductions of value could be drawn in these cases from the character or location of the pain as to the *exact* location of the appendix itself. The points of greatest tenderness or the most prominent portion of the tumor, if present, have been in a general way the guides to the incision. It should not be forgotten that the majority of the patients came from a class whose powers of observation are not specially acute. They would remember that they felt a pain in the belly, but until it became distinctly localized in the right inguinal region they would not be apt to note the exact point at which it was first felt. This may explain why the region just above the umbilicus has not been more frequently recorded as the point at which pain was first felt, for among more intelligent patients this region seems to be the most frequent seat of the initial pain.

In all patients who complain of abdominal pain the possibility—we might almost say, as regards men, at least, the probability—of appendicitis should be kept in mind and a systematic examination by palpation with a finger-tip be made at different points of the abdominal wall to ascertain the exact point of greatest tenderness, which may be found

directly over the appendix, even though the pain has not as yet been referred to that region.

Nausea and Vomiting.   Nausea and vomiting were

Severe in	6
Moderate in	40
Absent in	23
	69

The vomiting occurred usually once or twice at the beginning of the attack, and was not, as a rule, repeated after that. Some nausea persisted in about half the cases. Of the six patients with severe nausea and vomiting, 3 were cases of general septic peritonitis and 3 had large abscess-formations.

Considering the severity of most of the cases, it appears rather unusual that vomiting should have been absent in just one-third of them. It seems to us that vomiting at one time or another during the attack might be expected in at least 75 per cent. of this class of cases.

Chill.   The occurrence of one or more chills is recorded in ten cases. In all of these there was suppuration in some form :

Large abscesses	4
Cases of general septic peritonitis	2
Double pyosalpinx and a cheesy slough in appendix . .	1
Pus in or about the appendix	3
	10

A distinct chill does not seem to be of common occurrence, at least in the early stages before the formation of an extra-appendical abscess. In sensitive patients, however, chilly feelings at the onset of the attack are not uncommon.

Condition of the Bowels.   Constipation more or less marked has been the rule.   The following table will show this :

Constipation throughout[1]	58
Constipation followed by diarrhœa, not the result of medicine	2
Regular throughout	2
Diarrhœa throughout	3
Doubtful	4
	69

It may be of interest to note that although the constipation is usually attributed to a paresis of the musculature of the gut, in almost all these cases at the time of operation the caput coli was found to be empty. With the exception of the cases of chronic appendicitis who were operated upon " in the interval," no cathartic was given before operation, the

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[1] Four of these were almost obstipation.

rectum being emptied in many cases, however, just previous to operation by a pint to a quart of fluid as enema.

In the three cases exhibiting diarrhœa throughout there was nothing of note in the symptoms previous to or in the conditions found at the time of operation or in the following course of the trouble which would explain this somewhat unusual symptom. The absence of constipation is generally regarded as a favorable sign, and yet in each of the nine patients whose bowels were not constipated the conditions found at the operation showed the necessity of surgical interference.

Presence of a Tumor. Of the 69 cases, 26 presented masses in the right side, felt from the outside before or during anæsthesia. In 43 no mass could be made out, even under anæsthesia. Of the 26 cases where a mass was felt in the right side, 24 were abscesses, 2 were masses made up of appendix and adhesions, with no pus to be seen macroscopically.

Tenderness existed in all cases to a more or less marked degree in the right iliac fossa. In one case (4) it was so slight as to lead to a suspicion that the trouble was not in this region; the appendix, however, was found swollen, erect, and, according to the pathologist's report, its mucous membrane was thinned, ulcerated, and presented some fibrous induration. It contained pus and fecal matter. In the chronic and recurrent, and, indeed, in the majority of the acute cases, the point of greatest tenderness was directly over the seat of the appendix, in the neighborhood of McBurney's point.

Muscular Rigidity. The right rectus and right lateral abdominal muscles were

Markedly rigid in .	7
Moderately rigid in	22
Not rigid in .	24
No record in .	16
	69

In the seven cases of marked rigidity five presented an altered or thickened or adherent condition of the parietal peritoneum on the right side, in the neighborhood of the incision.

Tympanites. Moderate or marked in the cases of general septic peritonitis (although absent in Case 65). Not noticed to any very marked extent in the others. Tympanites is a symptom of the greatest value. Unfortunately the record of this sign in the histories has been so neglected that an accurate estimate of its frequency or extent cannot be given.

Temperature and Pulse. Of the operative cases that recovered, those presenting the highest temperature and pulse on admission were Case 16 (male, aged eighteen years), with an admission temperature of 104.7° F. (with a pulse of 120), and Case 32 (female, aged twenty-eight years),

with a pulse of 140 (with a temperature of 104.5° F.). All the cases presenting *on admission* either a higher temperature or a more rapid pulse than the above died. Upon looking over the cases it may be said that the height of the temperature on admission seems to have offered but slight help in reaching a conclusion concerning the severity of the process.

The pulse is of more value than the temperature. In a vigorous young adult a temperature of 103° or even 104° may be present at the *beginning* of the attack, and yet the case may prove to be a mild one. So a pulse of 110 or more may accompany this temperature in this class of patients. A pulse of 110 or 120, with a temperature below 101°, is apt to indicate a serious attack.

Bladder Symptoms. In only three cases have symptoms referable directly to the bladder been observed—Case 3, ardor urinæ (no urethritis), tip of appendix deep down in pelvis, inflamed ; Case 28, increased frequency, no urethritis and no cause found in the location of the appendix ; Case 31, retention, a deep abscess between caput coli and bladder, deepest part within one inch of the perineum.

QUESTION OF OPERATION. This is the most important point in the treatment of appendicitis. Of course, there are many cases where no doubt can arise as to the necessity of operative interference. When the presence of pus is assured the sooner operation is done the better. Also there are cases which begin and continue for twenty-four or forty-eight hours with such severity that any judicious mind must conclude that operation is demanded. So in the chronic and relapsing cases, where the symptoms have continued for months with such severity or have recurred so frequently as to subject the patient to a life of semi-invalidism, no wise surgeon can counsel any other plan of treatment than removal of the diseased appendix. Likewise when a patient has suffered from three or more attacks the offending organ should be removed, for other attacks will, in all probability, follow. The same indication for operation also exists, in our opinion, if a patient has suffered from two attacks within a year or even two years. This, however, brings us on to debatable ground.

It is much easier to determine when operation is indicated than when it may be safely omitted. Instead of debating and discussing the question, " When shall we operate ? " we should rather ask, " When is it safe to dispense with operation ? " Of course, if the view is adopted that every case of appendicitis should be subjected to operation, we are saved the responsibility of deciding these questions. The view, however, which we take is that operation is not necessary in every case of appendicitis. We believe that not infrequently patients recover, and recover permanently, from one attack of appendicitis, and that in a certain number of cases, provided a careful watch is kept, operation is not

necessary. On the other hand, we acknowledge that many cases which have not seemed serious have been allowed to die when they might have been saved by operation.

How can we decide in what cases operation is demanded and in what cases it may be omitted? This is one of the most difficult questions in surgery. It cannot be decided by the presence or absence of any one symptom, neither can definite rules be laid down as to the management of these cases. When in doubt, however, it is better to operate than to delay.

The general appearance of the patient is of as much value as any other single symptom. To judge correctly of this a considerable experience is needed. It cannot be described in words. The whole attitude of the patient as well as the facial expression and color must be taken into consideration. Too much reliance, however, should not be placed on this symptom. Certain patients, even in an advanced stage of septic peritonitis, do not present the appearance of one critically ill. Indeed, they sometimes look surprisingly well. More than once we have been surprised at feeling an almost imperceptible pulse at the wrist of a patient whose countenance looked bright and whose mind was perfectly clear.

The temperature is of some value. As already stated, a high temperature during the first twenty-four hours need not necessarily be alarming; but if continued into the second twenty-four hours, it is apt to mean mischief. In a mild case it should fall after the first twenty-four hours. In the most critical cases, however, a low temperature (under 100°) is not uncommon.

The pulse is of more importance. A rapid pulse at the beginning of a *first* attack, if accompanied by high fever, need not necessarily cause alarm; but if it continues or increases in rapidity, operation is probably indicated. After the first twenty-four hours a pulse of 120 certainly calls for removal of the appendix. On the other hand, the pulse in the severest cases may remain under 100. Many a case of septic peritonitis has died with a pulse which has never risen above 100 or a temperature above 99.5° until just before death. Case 65 is an example— the temperature being but 100.2° and the pulse 100 at the time of operation, and yet a well-marked septic general peritonitis was found.

Vomiting, if continuous, is a symptom of the gravest import. At the beginning of an attack there may be vomiting for an hour or two, without exciting alarm; but if it continues, or if it reappears at a later period, operation should not be delayed.

Tympanites is another grave symptom. If the abdomen distends and no flatus is expelled, it is apt to mean extension of the inflammation to the adjacent intestines. Constipation is also a symptom of importance, although the natural habit of the patient must be considered in this

connection. If the bowels move without catharsis, it generally means that the attack is a mild one, though there are numerous exceptions to this rule, as has already been mentioned (see Cases 12 and 58). If the bowels refuse to move in answer to cathartics, the case must be regarded as one of considerable gravity.

Rigidity of the abdominal muscles is often of the greatest value in determining the severity of the attack. In nearly every case the muscles over the appendix show a certain amount of rigidity. If it continues marked, it indicates the persistence of the inflammation. If it extends as far as the median line or beyond, it means, generally, extension of the inflammation. At the beginning of the invasion of the general peritoneal cavity this symptom is often a most valuable guide. As for example, Case 65, where the muscular rigidity was the one symptom which indicated the gravity of the case and the necessity of immediate operation. With the pulse and temperature but little elevated and with the absence of vomiting, a delay until the next morning would have seemed safe had it not been for the rigidity of the abdominal muscles.

As already stated, it is impossible to give positive indications for operative interference; but in general it is indicated when at the end of twenty hours the following conditions exist:

1. If the patient looks ill; if there is vomiting and tympanites, with a rapid pulse.

2. If the patient looks ill and there is vomiting, even though the pulse and temperature are each under 100.

3. If the patient looks ill and the pulse is over 110.

4. If there is a rapid and feeble pulse and extreme tenderness.

5. If the local pain and tenderness, at first localized, tend to become general, even though other grave symptoms may be absent.

6. If local pain and tenderness have continued for more than four weeks, or if without diminution for more than two weeks.

Probably no surgeon of experience, in this country at least, will question these indications. In the "old world" another five years will be required to remove the prejudices of the past on this subject, at least among most of the surgeons in England and Germany.

A class of cases, however, remains which will not come under either of these categories. These are the difficult cases. Operation may not seem necessary, and yet it is almost impossible to say, in seemingly mild cases, at what moment serious symptoms may arise. These patients experience a sense of abdominal discomfort or distention, moderate pain beginning at first near the umbilicus, becoming in fifteen or twenty hours centred in the right inguinal region, with moderate tenderness over the appendix. At the commencement the pulse is under 100 and the temperature under 100.5°. There may be slight abdominal distention; the bowels may or may not have moved.

In such cases what shall be done?

No categorical answer can be made. If the patient does not look ill, a delay of twenty-four hours is safe. If in another twenty-four hours the symptoms do not increase, operation may still be postponed. The third twenty-four hours should decide the question. In a favorable case the pain and tenderness should decrease and the pulse and temperature diminish. In such circumstances operation may be postponed with the expectation that the patient will at least recover from this attack. If, on the other hand, in the second or third twenty-four hours any of the symptoms increase, especially the pulse and tympanites, or should there be vomiting, immediate operation is indicated.

As already stated, in chronic or recurrent cases it is generally wise to operate in those patients who have had two distinct attacks. A third will probably follow, and it may be the one when a gangrenous spot in the wall of the appendix will rapidly develop and may lead to general peritoneal infection. Under such circumstances the risk of operation is immensely greater than it would be were it performed between the attacks, when the inflammation is in a quiescent state. If possible, the operation should be done in the interval between attacks. There is less danger of sepsis, a smaller incision will suffice, no drainage will be needed, and consequently there will be less danger of subsequent hernia.

In still another class of cases it is sometimes exceedingly difficult to decide whether operation should be advised or not. Such patients have apparently recovered from their first attack of appendicitis. During the following six months or year, however, they will have a sense of discomfort in the region of the appendix. It may be very slight, and yet it is a "grumbling" that should not be ignored. If these patients live within reach of a surgeon, operation may not be indicated; but they should be cautioned in regard to diet and hygiene, and, if travel in foreign lands or in the wilds of our own country be proposed, they should be strongly urged to abandon their trip or to submit to an operation for removal of the appendix before their departure.

COMPLICATIONS. As complicating conditions there were:

(a) General septic peritonitis 12
(b) Pyosalpinx 5
(c) Obstruction due to constriction of splenic flexure of colon by intestinal band 1
(d) Subphrenic abscess 1
(e) Pregnancy 1
(f) Parenchymatous nephritis due to previous operation on kidney—cholecystitis, biliary calculi . . . 1

                                                              ——
                                                              21

Pyosalpinx. This was found in five cases as a complicating condition, the tumor being on one or on both sides. When on the right side, the

appendix was found adherent to the mass below, the inflammatory zones from each source having presumably met and amalgamated the appendix and pus-tube into one mass. In each of the five cases examination of the appendix showed that it was responsible, in part at least, both for the local condition found and for the systemic symptoms shown—cases where only the peritoneal coat of the appendix was seemingly involved by spread of the peritonitis from the pelvic organs not being included in our list of "appendicitis." These five cases with complicating pyosalpinx all recovered.

In women it is often extremely difficult to distinguish between a pyosalpinx on the right side and an appendicitis. Even with the abdomen open it is sometimes impossible to determine to which organ the origin of the mass should be assigned. We have no faith in the ability of any diagnostician to map out by palpation the appendix in the majority of women. Even after opening the peritoneal cavity the recognition of the healthy appendix by palpation alone is often uncertain.

Obstruction due to Constriction of the Splenic Flexure of the Colon by an Intestinal Band. One case (4), a patient who had suffered from several previous attacks of appendicitis. There were alternating attacks of constipation and diarrhœa, and the progress of the fecal matter down the large intestine seemed to be often attended with much abdominal distress and rectal tenesmus. One intestinal band stretched directly across the splenic flexure, causing a moderate amount of constriction with some angulation; another stretched across the ascending colon; they were severed by the operator. The patient made an uninterrupted recovery, and while under observation was free from the abdominal pain and attacks of rectal tenesmus. The appendix was found in the right iliac fossa and was the seat of chronic inflammation.

Subphrenic Abscess. The case (38) was one of chronic recurrent appendicitis in her second attack. She had been sick one week, and presented a large abscess in the right iliac fossa; a second abscess had formed apparently posteriorly and higher up, not directly connected with the one in the right iliac fossa. In the first operation the appendix abscess was opened and thoroughly drained, the appendix not being removed, as it could not be seen or felt, and it was not deemed wise to open the peritoneal cavity to search for it. In spite of the thorough drainage of the evacuated pus-cavity the patient's pulse and temperature kept up. Frequent examination of the abdomen and chest did not reveal the source of trouble until forty-six days after the first operation, when signs of a subphrenic abscess were made out posteriorly on the right side. This was opened up in the interval between the ninth and tenth ribs, about midway between the posterior axillary and mid-dorsal lines.

The cavity extended downward for some depth; it was washed out and drained with rubber drainage-tubes through this incision and a counter-opening made below at what seemed to be the lowest part of the abscess-cavity; while the patient was under ether the remains of the appendix, which had been giving her some trouble, were removed through the abdominal scar of the first operation. The convalescence was uninterrupted, but slow. She left the hospital in excellent condition three months after admission, both wounds being healed.

Pregnancy (at sixth month). One case (24). The condition was easily recognized before operation. This patient was suffering from chronic recurrent appendicitis, and was operated upon during her second attack. The appendix symptoms were moderate in character, and the diagnosis seemed a fairly clear one. Of interest is the fact that a mass felt, under ether, between the pregnant uterus and the anterior superior spine of the ileum, about the region of McBurney's point, turned out to be the large, fimbriated extremity of the right Fallopian tube. The operation was on the sixth day of the attack. A large, gangrenous appendix was found bathed in pus, which the peritoneum had so far made little or no attempt to shut in. It is probable that here the gradually rising uterus had torn away adhesions formed between it and the appendix in the previous attack, and thus set free the septic matter on or about the appendix. The pus was completely evacuated and the appendix removed. The patient made an excellent recovery, her temperature not rising above $100.2°$ F. at any time after the operation. This patient did not abort.[1]

From the data collected so far it is certain that both mother and child are in imminent danger, and the advisability of immediate operation at whatever period of utero-gestation seems to be generally conceded. It would also appear that the outlook for the fœtus is distinctly better in the cases submitted to operation, whether its period of viability be reached or not. If the attack occurs before the period of viability, the uterus seems less liable to expel its contents following operation, and the probability of the fœtus being retained until full term is greater. If the attack occurs after the period of viability, the uterus seems more disposed to empty itself, even without operation, and if the mother be already septic from her appendix lesion the feeble vitality of the child may not be able to resist. In these cases the child has lived only a few

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[1] Fowler (Treatise on Appendicitis, pp. 64, 65) mentions five cases occurring in pregnant women, four of his own observation, and one cited by Talamon. They all died. Three aborted before operation; two after it.

Other cases have been reported, making a total of sixteen up to the present time. Of these, eleven were suppurative cases, with seven deaths. Of the children born during the attack, or shortly after, only one has lived as far as known. The last four cases reported (by Dr. Abrahams, November, 1896) previous to this one, were cases where the diagnosis seemed fairly plain, although not verified by operation.

days. This factor of the viability of the child certainly seems one well worthy of consideration. In view of the small number of children that have been carried on to term by patients who had suffered from a previous attack at any time during their pregnancy, and in view of the high mortality of the children born after the period of viability has been reached, it would seem that even if we do not take into consideration the great risk run by these mothers themselves, we should strongly advise for the child's sake operative procedure in any case of appendicitis complicating pregnancy.

TREATMENT. Of these 69 cases there were

Operated upon	60
Not operated upon	9
	69

Of the nine cases who were not operated upon two were cases of general septic peritonitis, moribund on admission. In six cases operation did not seem indicated, as the disease was evidently subsiding or had almost subsided at the time of their admission to the hospital. In these patients a later operation, after the acute inflammation had subsided, was considered safer. Unless the attack was their first and only one, they were advised to return at the end of two months for removal of the appendix. If the attack was their first, they were warned to return to the hospital should there be any intimation of return of their pain.

THE OPERATION. *Anæsthetic.*

Ether was administered in	47
Chloroform was administered in	11
Ether and chloroform were administered in . . .	2
	60

the choice being determined to a great extent by the condition of the bronchial mucous membrane, the heart, and the kidneys. When, however, the anæsthetic first chosen was not well borne by the patient, the other was administered, and, if more satisfactory, was persevered in; if not, a return was made to the first one. As a rule, chloroform is preferred.

Of the 60 cases that were operated upon, there were

Suffering from appendicitis, but without general septic peritonitis at time of admission to hospital	51
Suffering from appendicitis with general septic peritonitis which had developed before admission to hospital . .	9
	60

The cases are divided into these two groups, because it cannot but be misleading to class patients suffering from appendicitis alone without

infection of the *general* peritoneal cavity with those who had already developed a general septic peritonitis before their arrival at the hospital. It is true that in this latter class of cases the peritonitis was due to the appendicitis, but in the two groups of cases the prognosis and the treatment with its results must be very different.

First will be considered those cases who had not developed general septic peritonitis before their admission to the hospital. In many of these enormous abscesses were formed, but always shut off from the general cavity by a wall of adherent intestine.

Of the 51 cases operated upon that had not developed general septic peritonitis before admission to the hospital, there were

Recoveries	50
Death[1]	1
	51

an operative mortality of 2 per cent.

Incision. The usual incision has been the oblique one over the most prominent part of the tumor, when present; when the mass was situated low down, however, the incision just above and parallel to Poupart's ligament, already mentioned, was resorted to so as not to infringe upon the peritoneum. In cases presenting no mass the incision has usually been an oblique one, with its centre corresponding closely to the point of greatest tenderness in the right iliac fossa, generally midway between the anterior superior spine and the umbilicus. The length of the incision has been regulated by the special conditions of each case. In certain thin patients it has been but little more than an inch in length; in stout patients, especially where an enlarged and gangrenous appendix was found tightly adherent behind the cæcum, its length has sometimes been four or five inches. In cases where there is no evidence of pus outside of the appendix two fingers are inserted through a small opening and the cæcum, with its appendix, drawn outside, when the appendix is removed. In cases, however, where pus is suspected, as soon as the peritoneal cavity is opened gauze pads are employed to hold back and to protect the intestines from contact with any septic material which may be set free in the act of loosening the appendix, which is thus completely walled off from the general peritoneal cavity. As each abscess-cavity is opened the pus is absorbed by sponges.

In ten cases the intermuscular operation of McBurney was employed; in seven for chronic relapsing, in two for recurrent, and in one for subacute appendicitis. The abdominal incisions in all cases united by primary intention throughout, the result being a perfect scar. In many cases this is a most admirable method, and it might have been more

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[1] One case of general septic peritonitis developing after operation.

often employed with advantage. It seems suitable for all cases except where there are collections of pus outside the appendix or very firm and extensive adhesions. Should the opening thus made be inadequate for the necessary manipulations, it can easily be enlarged by incising the internal oblique muscle as in the ordinary operation.

LOCATION OF APPENDIX. Unusual positions are recorded in Case 29, where it was situated just below the liver, posteriorly and deep down, and in Case 34, where an eight-inch-long appendix ran up back of the cæcum almost to the liver; a more common situation in Case 3, where from its position it gave rise to the bladder symptoms mentioned, and Case 62, where it was situated posterior to the uterus, the mass being clearly felt by vagina.

Abscess. Of the 60 cases operated upon, in 27 there was a " localized abscess." In these 27 cases the appendix was

Removed in[1] 13
Not removed in 14
                                                    ——
                                                    27

The rules determining the removal or non-removal of the appendix in abscess cases have been in a broad and general way as follows:

In a large abscess case, where the appendix has not been more or less clearly seen or felt in the wound after the evacuation of the pus and the cleansing of the abscess-cavity, it has been deemed wise not to separate adherent coils of intestine and open up the way for further infection in the hopes of finding an appendix which has probably already sloughed completely away. It is a fact that most of these cases do well and have no further trouble. Should the appendix be left behind and give trouble afterward, the patient, as a rule, stands a much better chance in a later operation, where the danger incident to the opening of the peritoneal cavity is comparatively slight. If the appendix, however, is plainly seen or felt, and the chances of removing it without opening up the general peritoneal cavity or infecting a considerable part of it seem good, an attempt is usually made to remove what remains of it, provided a clear view of the field of operation can be obtained. Under these conditions we find that after a thorough cleansing of the abscess-cavity has been effected by means of sponges wet in 1 : 1000 bichloride solution, should a small opening be made into the peritoneal cavity (such as may be brought about by the removal of an appendix which constitutes a portion of the abscess-wall itself) the danger of infecting the general peritoneal cavity does not seem to be great, provided the opening thus made is drained by a piece of gauze inserted between the

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[1] Of these, ten were "simple abscess" cases, three were abscess cases with general septic peritonitis on admission.

coils of intestine at this point and brought out with the other gauze drainage-strips through the incision.

This is shown by the fact that in the ten "simple abscess" cases mentioned above where the appendix was removed the peritoneal cavity was opened in each case in so doing, and all of them recovered.

CONDITION OF APPENDIX.

Gangrenous (perforated)	17
Inflamed, not gangrenous	16
Constricted (or angulated) and inflamed .	11
Degree of inflammation not recorded	16
	—
	60

Two cases are recorded of tubercular appendicitis (25 and 47).

Fecal concretions (one or more) in	8
Pus in lumen of appendix (enough to be clearly seen) in .	14

The appendix was removed in all the cases except in such abscess cases as have been described above.

Removed in	47
Not removed in	13
	—
	60

TREATMENT OF THE STUMP. The mesoappendix is tied off, when possible, with catgut ligatures and the appendix cut away from it. A catgut ligature is then placed around the base of the appendix about one-eighth of an inch from its cæcal origin, and the surrounding intestinal coils protected from the appendix by sterilized gauze pads. The appendix is now severed just beyond the ligature by scissors, which are immediately resterilized. This severance of the appendix is facilitated by pinching a small fold of the peritoneal coat of the appendix between the blades of a pair of forceps which hold the appendix-stump up and away from the surrounding parts. The divided surface of stump and its lumen are now thoroughly cauterized with a fine-point Paquelin cautery, and a second ligature, generally of catgut, is applied to the stump similarly to the first and in the same furrow, in order to reinforce it, for fear that the original ligature may have been damaged by the cautery. This simple method has been found perfectly satisfactory, and in our opinion the more elaborate methods are unnecessary and perhaps less successful.

Catgut ligatures and cautery in	26
Silk ligatures and cautery in	12
Catgut ligature only (pus cases drained) . . .	2
Silk ligature only (pus cases drained)	2
Cautery to stump, then reflection of serous cuff and catgut sutures	1
Packing inserted to region of stump (sloughed) . .	17
	—
	60

DRAINAGE OF THE WOUND. As a rule, where no pus has been found outside of the lumen of the appendix, drainage has not been employed. Where, however, extensive adhesions have necessitated much separation of opposed intestinal coils a small strip of sterile gauze has usually been inserted for drainage.. At its exit from the peritoneal cavity, and during its transit through the abdominal part of the wound, it has often been surrounded by a small cuff of sterilized rubber tissue. This facilitates its removal when it becomes necessary, for it prevents the tissues in the abdominal incision from adhering to the gauze, and the pain and bleeding are thereby obviated.

In pus cases, after the evacuation of the pus, the cleansing of the cavity with sponges moistened with 1 : 1000 bichloride (and the removal of the appendix if the case is a favorable one for that procedure), the abscess is drained from the bottom up by strips of iodoform-gauze introduced to the depths of the cavity and brought out through the abdominal incision.

In the intermuscular operation, where there has been no pus outside the appendix and the adhesions separated have not been too numerous, and due care has been observed in the technique of the various procedures attendant upon the removal of the appendix itself, the sterile stump is dropped back into the general peritoneal cavity and the various layers of the abdominal wall in the wound are brought together separately by means of catgut buried sutures; the skin edges are united by means of silk sutures and the wound closed without further drainage. Should, however, the subcutaneous fat in the incision be excessive in amount, a small piece of rubber tissue folded several times upon itself and about one inch long by one-eighth inch wide, is inserted between two skin sutures down to this fatty layer, serving as an efficient drain for twenty-four to thirty-six hours, when it is no longer necessary and is removed.

No drainage employed in	15
Drainage employed in	45
	60

OUT OF BED AND DEPARTURE FROM HOSPITAL. The patients are "allowed up" as soon as the condition of the scar-tissue warrants it. A patient upon whom the intermuscular operation has been performed and who has done well is usually allowed to sit up in twelve to fourteen days. Those operated upon by the ordinary oblique incision, where the wound has required little or no drainage, remain in bed for about three weeks. The abscess cases are not allowed out of bed until the scar is firmly united or has healed to a small, granulating spot. When they have regained their strength all patients are allowed to leave the hospital.

Out of bed in 2 weeks	(10th to 14th day)	.	.	.	.	8
" " 3 "	(14th " 21st ")	.	.	.	.	16
" " 4 "	(21st " 28th ")	.	.	.	.	17
" " 5 "	(28th " 35th ")	.	.	.	.	7
" " 6 "	(35th " 42d ")	.	.	.	.	2
" " 7 "	(42d " 49th ")	.	.	.	.	1
" " 10 "	.	.	.	.	.	1
No record in .	.	.	.	.	.	1
						——
						53

RESULTING SCAR. In all cases which have been treated without drainage the scar has been perfectly firm. As far as is known, hernia as the result of operation has been exceptional. With the cæcum and ascending colon directly under the incision there seems to be little tendency to hernial protrusion, even though the abdominal wall is much weakened, as must necessarily be the result in many cases where drainage has been employed. The majority of these patients have been examined months after their departure from the hospital, and one case only of hernia has been recorded; nevertheless, a considerable number have been lost to view, and in some of these a hernia may have appeared. In many of the cases where drainage was used sutures of silkworm-gut were passed through the lips of the wound, but not tied until the gauze was removed on the third, fourth, or fifth day. Theoretically, this seems a useful procedure, but often a stitch-abscess forms in their tract and the efficiency is questionable. In many cases, however, where, after operation, there has been left a wide, gaping wound, it seems wonderful how well nature has approximated the edges and brought about a good cicatricial closure of the abdominal wall.

The resulting scar was so weak as to necessitate

Secondary suturing of wound (before leaving hospital) in . 2
Hernia operation of wound (before leaving hospital) in . 1
——
3

Each of these three cases was complicated by a large abscess, and necessarily a large wound for free drainage.

A partial secondary suture was attempted in several other cases at the end of a few days, generally between the fourth and twelfth days. In a few of these benefit resulted; in others the suture cut out. When a large, foul abscess has been opened, the wound is not generally clean or in a condition for secondary suture for at least ten days, or, it may be, for three or four weeks.

Fecal fistula developed in Cases 12, 15, 34. All closed in the course of three or four weeks, and have given no further trouble. As a rule, a fecal fistula need cause no special anxiety. Its presence is generally noticed at the first dressing on the fourth or fifth day. Even if the

fecal discharge is profuse, the fistula may be expected to close within four weeks. Its persistence is exceptional. In a personal experience of over two hundred cases we have encountered a permanent fecal fistula in only one patient. In this case, which had been a chronic appendical abscess of months' duration, there was found, at a later operation performed for closure of the fistula, a portion of appendix about three-quarters of an inch long, with a gaping mouth.

Second. Cases of general septic peritonitis (11 cases). Of the 11 cases suffering from appendicitis with general septic peritonitis, which had developed prior to admission to the hospital, there were

Operated upon	9
Not operated upon	2
	11

Of the 9 cases of appendicitis with general septic peritonitis that were operated upon there

Died	6
Recovered	3
	9

an operative mortality in cases of general septic peritonitis from appendicitis of $66\frac{2}{3}$ per cent.

Every case of septic peritonitis was subjected to operation unless it seemed certain that the patient would die on the operating-table. Without operative interference there can be but one result—*i. e.*, death—and in consequence operation seems justifiable even in the most desperate cases.

General septic peritonitis is supposed to be almost invariably fatal, and yet out of these eleven cases that had developed this condition prior to admission to the hospital three were saved by operation. Doubt is sometimes expressed as to the correctness of the diagnosis of "general septic peritonitis" in cases which recover after operation. The diagnosis is beyond question, however, when, on opening the peritoneum, pus or purulent serum, not shut in by adhesions, wells out; when the intestines throughout are injected, distended, and bathed by this same fluid, which has permeated all parts of the peritoneal cavity. In addition, the intestines may be simply sticky with lymph or be covered by large, thick layers of this material, and yet without sign of distinct adhesions, except possibly about the diseased appendix.

As a rule, the systemic symptoms indicate, in a measure at least, the extent of the septic inflammation which exists in the abdominal cavity. In some cases, however, the symptoms which we would naturally expect to find may be absent, and under such circumstances operation may unfortunately be delayed until the case is almost hopeless. Of such a

character was Case 62. This girl, who was a lady's maid, had packed fourteen trunks on Monday afternoon, had travelled to New York, and had eaten her dinner at 7 o'clock with apparent comfort. Toward midnight she complained of pain, but was not considered ill until the following morning. On Tuesday at 4 P.M. laparotomy was done and a general septic peritonitis found which must have developed at least twenty hours previously, and yet the patient had complained of pain only fifteen hours before the operation and had not appeared critically ill until an hour or two before the abdomen was opened.

The condition of three of the patients operated on was so desperate after the abdomen had been opened that the operation was necessarily limited to evacuation of the pus, with an incomplete irrigation and insertion of drainage. Whenever possible, however, an attempt was made to carry out the details of operation according to the following rules:

1. Chloroform as an anæsthetic is preferred to ether.

2. The incision should be a long one.

3. The purulent fluid is allowed to run out, its escape being perhaps aided by turning the patient on the right side. The intestines in whole or in part are allowed to escape from the abdominal cavity, hot towels being used for their protection.

4. A very thorough flushing out of the peritoneal cavity by means of hot aseptic salt-solution (after the appendix has been removed and the stump sutured).

In cases where, on account of the extreme distention of the intestines, it is considered inadvisable to allow them to escape to any considerable extent from the abdominal cavity, the irrigation is carried out as follows:

The edges of the incision in the abdominal wall are grasped by the assistant, held well up, and separated to their full extent; the operator then floods the abdominal cavity from above with the solution from a flask held in his right hand, while with the left introduced among the intestinal coils he moves them gently from side to side, allowing the solution to have full access to every recess and fold. The hot solution is then made to flush out still further the hepatic and splenic corners above and the pelvic pouch below by means of the irrigating-tube introduced into these angles above and below, the irrigation being kept up until the return fluid is perfectly clear. If the patient's condition then warrants it (and it often does, for practically the hot irrigation acts more as a distinct stimulant than otherwise), the flooding by means of the hot solution poured from the flask is repeated, several gallons in all being used. In cases of moderate distention the intestines were allowed to escape into hot towels in the hands of the assistants, the patient being turned on the right side. The intestinal coils while thus held outside

the abdomen are thoroughly washed by hot salt-solution, as is also the cavity of the abdomen. The greater part of the salt-solution which remains behind in the abdominal cavity after these procedures have been thoroughly and minutely carried out is then allowed to escape. A considerable amount is, however, left in, both as a means of stimulating the heart and to favor intestinal drainage.

5. *Drainage.* Strips of " sterilized " gauze are inserted in various directions among the intestinal coils, one strip always leading down to the appendix-stump or seat of trouble, the ends of all the strips coming out through the abdominal incision, the edges of which are brought just near enough together by silkworm-gut sutures to prevent the sudden protrusion of intestinal loops during the efforts at vomiting which follow the anæsthetic. In addition to the gauze a large glass tube is sometimes employed.

6. Injection into the small intestine of an ounce of magnesium sulphate in a saturated solution, the needle-puncture being generally closed by a Lembert suture. We consider this procedure of the greatest value. In Cases 62, 63, and 65, where it was employed, we believe that the result would have been fatal had dependence been placed alone on irrigation and drainage. In several other cases, not recorded here, it has been followed by the most gratifying results.

7. The administration of ten grains of calomel as soon as the patient recovers from the anæsthetic.

If the vomiting persists after operation, relief can sometimes be obtained by thorough lavage. Rectal enemata are employed and continued until the bowels have been thoroughly moved.

In all cases of septic peritonitis the prognosis will in great measure depend upon the length of time which has elapsed between the development of the disease and the operation.

Notes on the Individual Cases.[1]

Subacute Cases.

Cases 7, 18, 22, 30, 39, 45 were all either subacute in character, without any general systemic infection visible, or acute without any mass-formation whatever, which came into the hospital during the very last days of their subsiding attack, where the proper treatment seemed to be rest for the present and a later operation if necessary. One of these had another attack in three months and recovered after operation. The further history of the others has been investigated up to the time when this article goes to press. Half of them (3) have been heard from. None of these has had another attack, though No. 18, a physi-

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[1] For the tabulated list of all points of interest in connection with the histories of these 69 cases, see Annual Report of the Presbyterian Hospital (New York City), January 1897, vol. ii,

cian, has had an occasional dull ache in his appendix region, not to the extent, however, of preventing him from attending to his regular duties at any time.

Case 52 was a case in which operation was refused, though advised on account of the prostration, which, though mild, indicated a possibility of serious trouble in or about the appendix. She insisted on returning to her home before her temperature and pulse had fallen to normal. (Inquiry made during the last month has brought to light the fact that she immediately got worse after reaching her home and died within a week, presumably of general septic peritonitis.)

Abscess Cases.

Cases 5, 8, 15, 16, 21, 31, 35, 40, 44, 46, 48, 51, 60, 69 were abscess cases where, after evacuation of the abscess and the draining of the cavity, no structure resembling an appendix could be made out in any portion of the abscess-wall. No attempts were made, therefore, in these cases to break down the protecting adhesions, simple drainage in each case resulting in prompt recovery. In Case 21 the incision was made directly above Poupart's ligament, so as not to wound the peritoneum. In Case 69 the abscess seemed to be adherent to the abdominal wall, in the neighborhood of McBurney's point. This was found not to be the case. Making use of the opening into the general peritoneal cavity, however, for exploration, the operator was enabled to ascertain the precise point at which the abscess had become adherent. This was somewhat higher up and more lateral. The first wound was then sewed up, layer by layer, in the usual manner and the skin-incision covered with iodoform-collodion, whereupon a second incision was made over the site of adhesion and an entrance effected into the abscess-cavity without opening the general peritoneal cavity. (The first wound healed per primam.)

Cases 2, 19, 20 were those abscess cases where, following upon the evacuating and thorough cleansing of the abscess-cavity, a more or less altered appendix was recognized and removed without opening the general peritoneal cavity. Simple drainage here also resulted in recovery in each case. Case 2 presents some points of interest. Here a history of six days' obstipation pointed strongly to considerable intestinal paresis, the patient's condition, however, remaining fair. There were many adhesions and much necrotic omentum in the right iliac fossa, necessitating a large drainage wound. This was the cause of the cæcal protrusion, which was remedied by a secondary suturing of the wound before he left the hospital, the resulting cicatrix, which healed by primary intention, being a solid one.

Cases 3, 11, 12, 26, 54, 56 were also abscess cases where an altered

appendix was recognized in the wound and removed, but in which, during the manipulation necessary for the removal, the general peritoneal cavity was opened. These cases also were all drained, an additional strand of iodoform-gauze being inserted between the intestinal coils at the point where the entrance had been made. These patients all made excellent recoveries. Cases 12 and 26 are of more than usual interest.

Case 12. The patient, a young minister, had complained of colic beginning five days before, but had kept at his usual work. Twelve hours before admission his temperature and pulse jumped up to the neighborhood of 101° F. and 80, respectively, and there was a rapid growth of a mass in the right iliac fossa, with systemic symptoms. The operation was done just in time to prevent the spread of a septic peritonitis, the peritoneal cavity containing already free serum; a gangrenous spot from the appendix had spread to that portion of the cæcum which was adherent to it. This was thought to be the cause of the fecal fistula which was found at the second dressing, but which closed completely in a short while. The abdominal scar left here was a good one, and remains so now, eighteen months after the operation.

Case 26. An acute case (first attack), with the formation within six days of three separate and distinct abscesses in the right iliac fossa, one containing the gangrenous appendix and its fecal concretion. The removal of the appendix and the drainage of all three abscesses were followed by complete recovery.

Pyosalpinx Cases.

Case 1. The probability of a double pyosalpinx with appendicitis being entertained previous to operation, all three foci were reached by a median incision and both pyosalpinx masses removed with the inflamed appendix. The wound was sewed up without drainage.

Case 25. The symptoms were evidently due both to the pyosalpinx and to the appendicitis. The inflammation in the appendix proved under the microscope to be tubercular; that in the Fallopian tube nontubercular. There was a small, swollen gland in the mesoappendix.

Case 32. This case came in for her pyosalpinx, the appendicitis developing while under observation in the ward. Her temperature and pulse were 104.5° F. and 140 before operation, due undoubtedly to both lesions. The appendix was inflamed and its zone of inflammation had merged into that of the right pyosalpinx.

Case 43. Of the chronic, relapsing variety. The appendix and the Fallopian tubes were found inflamed. They were removed and the retroverted uterus was ventrofixated.

Case 47. A chronic case; the appendix, tubes, ovaries, uterus, rectum, and bladder were all united into one adherent mass. The appen-

dix presented a cheesy, tubercular slough at its base. It seems hard to say here just where the primary tubercular lesion was (compare 25 of this list). There were also tubercular-looking spots on the cæcum.

Tubercular Cases.

The two cases of this form of inflammation have been mentioned above (28 and 47). There was nothing in the pre-operative history or behavior of these cases to lead one to suspect that the trouble was of a tubercular nature. No other foci of tuberculosis were to be found anywhere in the body.

Cases Operated upon by the Intermuscular Route.

Cases 10, 13, 14, 41, 50, 52, 59, 64, 66, 68. Presenting perhaps unusual features are Cases 10 and 41.

Case 10. Chronic, relapsing appendicitis (obliterans). She had had several previous attacks of catarrhal endoappendicitis, which had completely destroyed the mucous-membrane lining. The appendix was not adherent. It was completely imperforate. She was up on the fourteenth day, and went home on the seventeenth with a perfect scar.

Case 41. Her grandfather had died from appendicitis (inflammation of the bowels), without operation. Her mother is Case 1 of this list, operated upon for appendicitis fifteen months ago. This is the daughter's first attack (a mild one), the appendix, however, presenting considerable changes of its structure. The intermuscular operation resulted in a perfect scar.

Following these may perhaps best be mentioned Case 27, where the operation, although not done by the intermuscular route, still resulted in a scar which for all purposes is a perfect one.

Case 27. The house surgeon. The advisability of an intermuscular operation was considered here, but owing to the probability of adhesion and pus the ordinary operation was decided upon. The incision, however, was only about one and a half inches long, just enough to admit the finger to the appendix region, to separate the adhesions and bring the organ up for removal. It was particularly desirable to give the patient a strong scar, and the muscular layers were therefore brought into very accurate apposition and secured separately with buried catgut sutures. No drainage, followed by primary intention and a perfect scar. This patient played hard foot-ball this fall without any weakening of the scar or any sense of discomfort in this region.

Cases 24 (pregnancy case), 12, 15, and 34 (fecal fistula cases), 38 (subphrenic abscess case), already described.

Case 17 (post-operative septic peritonitis). A gangrenous appendix was found, surrounded by many fresh and old adhesions. The stump was cauterized and the peritoneal cavity drained by means of iodoform-

gauze. Notwithstanding this her temperature, forty-eight hours after operation, had risen to 106° F. and her pulse to 152, with symptoms of general septic peritonitis. She died the next day. This is the only death occurring after operation in the total of all the 51 cases of appendicitis which were not suffering from general septic peritonitis at the time of their admission to the hospital.

General Septic Peritonitis Cases.

Case 6 This was a first attack and a condition of intensely rapid general septic peritonitis from the start, originating in a gangrenous and perforated appendix. The patient presented to a marked degree all the symptoms of general septic peritonitis on her admission to the hospital. Her prostration was pronounced, and she had albumin and casts in her urine. The peritoneal cavity was found full of pus, coils injected and distended; no adhesions had formed to localize the infection. In spite of the most thorough flushing out of the peritoneal cavity and the removal of the appendix she died three days after operation.

Case 9. Another case of fulminating (twenty-four hours) general septic peritonitis, originating in a gangrenous appendix in his first attack. There was no evidence of the formation of any limiting adhesions about the organ. In spite of the operative procedures he died of sepsis four days later.

Case 23. This patient, who had had several previous attacks, came to the hospital almost moribund with general septic peritonitis and the abdomen full of purulent serum and scattered collections of pus. Immediate operation and a thorough flushing of the peritoneal cavity did not avail him, and he died sixteen hours after. Bacilli coli commune were found in profusion in the cultures from the free pus in the abdominal cavity. The trouble had started from a gangrenous appendix.

Case 29. A first attack with a general septic peritonitis within five days from a sloughing appendix. The patient came into the hospital almost moribund, free pus in the peritoneal cavity, coils injected and distended, and covered with lymph exudate. Patient died four days later.

Case 33. Another virulent case of general septic peritonitis from a sloughing and perforated appendix. The patient came in on the third day with a pulse of 180 and almost moribund. The peritoneal cavity was found full of pus, all coils distended and injected, and lymphatic throughout. Died eighteen hours later.

Case 55. A general septic peritonitis from an acute first attack, beginning fourteen days previous to admission. There were multiple abscesses scattered throughout the peritoneal cavity, coils deeply injected and distended. The operation improved his condition, but he died in four days.

Case 62. A case of exceptional interest. The patient, a maid-servant, complained of some abdominal pain on Monday evening, November 9, 1896, which had not prevented her, however, from packing fourteen trunks; after this she ate her supper. Within eighteen hours she developed the symptoms of general septic peritonitis, and at the operation, which was done Tuesday afternoon, November 10th, the general abdominal cavity was found full of pus, the coils injected and distended, and lymph-flakes all over intestines. A most thorough flushing of the peritoneal cavity was carried out, an intraintestinal injection of one ounce of sulphate of magnesium given, and the source of trouble, a large, gangrenous appendix, removed. The prognosis was, of course, a very bad one, but ten days after the operation her temperature had subsided to 99.2° F., pulse to 96, and respiration to 22. She had not vomited once. Her bowels had moved on the second day by simple enema and regularly without medicine ever since. The behavior of this case and of the next one is certainly instructive, and contains the strongest sort of an argument for a thorough operation, if possible, in these cases, no matter how far advanced the trouble may be, an important point being the thoroughness with which the peritoneal part of the technique is carried out after the removal of the appendix. The diagnosis of this case before operation seemed to be general septic peritonitis from pyosalpinx, the mass felt by vagina in Douglas's cul-de-sac being interpreted as the right tube. It was found to be the mass about the gangrenous and perforated appendix in an unusually low situation, and adhesions binding it down into the pelvis.

Case 63. Another general septic peritonitis case saved by the operative procedures mentioned above. He was brought in at night with the history of having been sick only for twenty-four hours. He did not seem very ill; pulse 104, temperature 104.2° F.; and there was some hesitation about the advisability of an immediate operation in his case. On account of the rigidity, however, which was decided, it was deemed best. It was found that the infection had spread from a large, inflamed appendix to the serous coverings of all the organs in the abdominal cavity; free pus everywhere; coils of intestine injected, distended, and dotted with flakes of newly formed lymph. On the third day after the operation the temperature had fallen to normal, and he has since gone on uninterruptedly toward recovery. This patient received likewise an intraintestinal dose of one ounce of magnesium sulphate, administered with two ounces of water with a large syringe and needle.

Case 65. A case of general septic peritonitis from appendicitis (chronic relapsing) presenting some unusual features. He gave, on admission, the history of having had fourteen similar previous attacks, with intense general abdominal pain and marked constipation. His abdomen was flat and intensely rigid. Temperature 100.2° F., pulse

100. Both the history and general condition seemed to point to lead-colic, the patient being a plumber, except that he lacked the blue-line along the margin of the teeth. It was decided, however, to operate, and a condition was found of general septic peritonitis throughout, originating in an intensely inflamed appendix. The peritoneal cavity was found full of free pus of thin consistency. The patient made an excellent recovery, leaving the hospital six weeks after the operation with the wound healed.

Cases 36 and 49 were both cases of general septic peritonitis occurring in chronic, recurrent cases where the patients practically came into the hospital only to die. In neither of these two cases, on account of the shock, would it have been possible either to administer general anæsthetics or to carry out the necessary measures under local anæsthesia. A stimulating treatment was the only one that could be given to them.

STROPHANTHUS: A CLINICAL STUDY.[1]

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DURING the years in which I have made use of the tincture of strophanthus I have frequently noticed that failures to obtain clinical results have repeatedly occurred. This experience is similar to that of other practitioners if we may accept the reports to be true which are found in current medical literature. In addition I have observed the very large doses which have been given without appreciable effect; these doses were certainly improper, in view of the brilliant results which often follow the administration of small or even moderate ones. Some months ago, on reviewing the literature, I was very strongly impressed by the discordant reports of observers whose position and training entitle their published observations to be seriously considered. In view of these facts the conclusion seems to be unavoidable that the source of the pharmaceutical preparations must be various. Faulty methods in drug preparation can be excluded, for in my earlier studies care was exercised that reliable tinctures only should be employed. With the intention of clearing up some of the inconsistencies, to say nothing of the contradictions, I have undertaken this study from the standpoint of the clinician, hoping to establish for the tincture, from a particular drug source, a practical working basis. From what I can learn I have come to the opinion that the so-called *Strophanthus hispidus*, variety

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Kombé, of the Pharmacopœia is not a variety, but a distinct species. In the following observations I have made use of a 5 per cent. tincture, prepared according to the United States Pharmacopœia from strophanthus (Kombé). In order that I might eliminate errors of pharmaceutical manipulation I have employed the tincture of strophanthus (Kombé) made especially for me by Parke, Davis & Company. For the drug which I have used I claim nothing further than that it is made from selected material by an expert pharmaceutical chemist. I have chosen clinical observation because of the rather scanty literature based upon sphygmographic work. Upon this species (Kombé) alone it is my intention to report, reserving for another occasion the presentation of similar studies upon what I believe to be four absolutely independent species of strophanthus.

After considerable experience with both Marey's and Pond's sphygmograph I have finally settled upon the use of Dudgeon's instrument as the one most practicable for the practitioner, and this has been exclusively employed in making the tracings for this study. The least pressure consistent with the production of a characteristic tracing has been used, and tracings presenting any suspicion of undue weighting, as rounded apices, have been rejected and a second tracing made. It is only fair to state that many of the patients had been treated, some for many years, with digitalis and similar drugs, and that all presented lesions giving rise to symptoms of marked severity. My purpose has been not to demonstrate that this particular preparation is one to be administered as a routine prescription, but rather to ascertain the dosage, to find out the real effects of administration, and to point out the advantages of its use when employed in a judicious manner. Incidentally, as will appear later, it will be shown to possess certain advantages over other drugs in relieving positive, well-marked pathological conditions.

The physiological action of strophanthus has been thoroughly worked out by Fraser and Delsaux. Its field of action is especially upon cardiac muscular fibre, and this action is marked. Therefore we should expect an energetic cardiac systole, and secondarily a slower pulse-rate. As a consequence of a slower and more perfect systole, an irregularity of rhythm previously existing becomes lessened. There is but little change in the calibre of the bloodvessels. It possesses a diuretic action under limitations; that is to say, it is diuretic so far as increased blood-tension causes a larger amount of urine to be excreted.

Clinically its action has been reported upon by many observers, and with a great lack of uniformity as to their conclusions. To mention only those whose published records are readily accessible, I would cite Fraser, Paschkis and Zerner, Corville, Egasse, Porteous, Lemoine, Drasche, Fränkel, Purdy, Helbing, Bahadhurje, Dana, Denian, Ham-

mond, Gley, Quinlan, Aulde, Mays, Budd, Pins, Hochaus, Wadleigh, Evans, Robinson, Hutchinson, Ferguson, and Yount.

Its therapeutic field of usefulness can be ascertained from the following facts: (1) it acts directly upon cardiac muscle (Fraser, Yeo, Biddle, Potter); (2) it has little or no influence upon the calibre of the blood-vessels (Fraser, Delsaux, Yeo); (3) it acts but temporarily upon the innervation of the heart (Hayem), if at all; (4) it is diuretic (Fraser, Delsaux, Porteous) in certain cases (Yeo), particularly those in which the previously existing blood-pressure is low (Budd); (5) it is a bitter stomachic (White), and in moderate doses does not disturb digestion (Budd), and it relaxes the bowels (Porteous); (6) it is antipyretic (Potter, Rovighi, but denied by Martini) within limited range, because under its administration the consumption of oxygen is smaller and the processes of combustion are depressed (Bartholow); (7) since its active principle is soluble in less than its own weight of water, it possesses the diffusibility of a soluble crystalloid (Fraser), hence the prompt results from its administration; its active principle escapes with the urine (Wood), so that we have also ready elimination (Butler), although somewhat slower than its absorption, and therefore an overlapping of effect from too frequently repeated doses (Bartholow); (8) habit does not seem to impair the therapeutic usefulness of the drug (Farquaharson).

The therapeutic indications are, then: (1) Rapidly recurring cardiac systoles of lessened force and irregular rhythm. We get then, first, a more vigorous contraction of the ventricle, with a slowing of the pulse-rate and consequently a lengthening of the diastole, which is the period of rest for the heart; next comes the disappearance of irregularity of rhythm; and lastly, from improved intracardiac nutrition, a permanent strengthening of the heart-muscle. (2) The absence of vasomotor effects enables us to use this remedy in those instances of permanent high tension which are met with in some forms of Bright's disease, in arterio-sclerosis, and in the rigid arteries of the aged. (3) Whenever diuresis can be promoted by increased blood-tension resulting from more vigorous cardiac contractions this may be expected from the use of this remedy. (4) The rapidly appearing effects of its administration, together with its regular elimination, make it the drug of choice when the symptoms are urgent. (5) The absence of digestive disturbances from therapeutic doses and slight likelihood of habituation to its administration make it important when long-continued use is necessary.

The instances in which failure will follow its administration are those of (1) advanced degeneration of the myocardium (Fraser, Quinlan); (2) extreme mechanical obstruction to the circulation from valvular in-competency or obstruction; and (3) a combination of these. Balfour does not find the remedy useful in the aged. When we remember that

arterial degenerations are extremely common in advanced life, I am of the opinion that Balfour is in error, at least so far as the use of moderate doses is concerned. It goes without saying that in fully compensated hearts this—as well as other drugs of the same type—is unnecessary, and when over-compensation exists it will likely aggravate the condition. I am thoroughly in accord with Hare in acknowledging its great value in the cardiac diseases of children. In addition, in corpulent individuals we obtain most excellent results. Of especial importance we should consider its administration for the weak hearts of anæmia and chlorosis, in order that nutrition may be improved; for the so-called irritable hearts, where the pain and palpitation are relieved; for the debilitated hearts, associated with dyspeptic symptoms and particularly flatulence, which usually disappears; and in the aged, where vertigo is the result of cerebral anæmia.

Sphygmographic tracings have been used to demonstrate the results of the administration of this drug by but comparatively few observers, among whom may be cited Sée and Gley, Paschkis and Zerner (two cases), Denian (six cases), and Fraser (five cases).

In general, it may be stated that within an hour the pulse visibly strengthened, the line of ascension, from being nearly horizontal, approached the vertical, the line of descent suddenly fell, the dicrotic wave disappeared, and the irregularities and inequalities were almost always overcome. Nor is this a temporary effect, as is shown by the permanence of the results upon continuation of the same or lessened dose, as may be seen in the following tracings made at intervals and extended over a considerable period of time.

CASE I.—Mrs. H., aged thirty-five years, married eight years, the mother of two children, came to me October 27, 1896, complaining of constant dyspnœa, severe pain in left chest, fainting upon several occasions, and distress after eating. She had had all of the infantile diseases, but no severe illness excepting severe polyarticular rheumatism ten years ago, from which she had practically recovered. For the past two years she had been failing in health, and in addition to the above symptoms she had complained of severe backache, bearing-down pains, vaginal discharge, irritability of the bladder, profuse and painful menstruation, for which she had been treated by a gynecologist of prominence for many months with but slight relief. On physical examination a rather obese woman with dusky skin and cyanotic lips presented herself. The apex-beat was in the sixth interspace, diffuse, and only located by the stethoscope in the mammillary line. At the apex was heard a soft, blowing murmur, coincident with the ventricular systole; at the second right costal cartilage were heard two murmurs: one harsh, with the ventricular systole, the other soft, replacing in part the aortic second sound, occurring with the ventricular diastole. The first cardiac sound as heard at the apex was of higher pitch, shortened, and distinctly weakened; the pulmonic second sound was accentuated. The liver was sensitive to the touch and distinctly below the free border of the ribs. At both

bases of the lungs posteriorly there were a dull percussion-note and many crepitant râles.   The urine was of a specific gravity of 1025, containing a trace of albumin, a few hyaline casts, and increased earthy phosphates. The abdomen was distended, tympanitic on percussion, and sensitive on palpation.   The diagnosis of the cardiac condition was mitral insufficiency, aortic obstruction and insufficiency, with dilatation of the left ventricle.   The pulse-tracing is as follows:

Fig. 1.
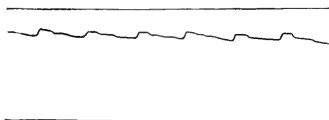
The tincture of strophanthus, hereafter in this paper simply termed "strophanthus," in dose of four drops dissolved in a wineglass of water, was directed to be taken after each meal.

November 3. The patient states that the dyspnœa has been markedly relieved during the past four days, and that the dyspeptic symptoms have improved.

One week later improvement in the symptoms referable to the genital organs was marked, although no local treatment had been carried out.

17*th*. She reports that for the first week in two years she has been free from chest-pain and that her appetite is excellent.   The passive renal congestion had disappeared, and the liver was no longer sensitive.

24*th*. The abdominal symptoms were much benefited and dyspnœa appears only on ascending stairs.

December 1. As the patient was on her way to my office she became very much alarmed at a street accident, but was positive that the palpitation was much less than on former occasions with less cause.

12*th*. All symptoms were so much improved that the patient again had resumed her social duties.

Fig. 2.
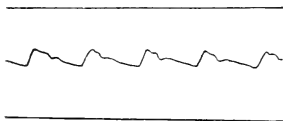
22*d*. Owing to the fact that the patient has been busily engaged in going about town, she has not improved, but has at least retained her previous improvement.

29*th*. To-day the report is decidedly favorable, there having been less backache and no dyspeptic symptoms.

January 5, 1897. Owing to mistake, the patient has received ten drops of tincture of digitalis in place of the strophanthus.   The old symptoms have returned, especially the dyspnœa.   Four drops of strophanthus are now to be taken thrice daily.

12*th*. The patient is in excellent condition.   The signs of ventricular

dilatation have now disappeared, and the first sound is now loud. The pulmonic second sound is normal and compensation is now established.

CASE II.—Mr. M., merchant, aged fifty-two years, consulted me on October 27 for increasing weakness, fatigue on slight exertion, with breathlessness and præcordial distress, of six months' duration. He was a small, pale, and slightly built man of quick, nervous movements. On examination I found that the percussion outlines of the heart were increased by two finger-breadths downward and to the left, and that there was marked intercostal retraction on cardiac systole. Over the whole of the cardiac area was heard a rough crepitation with both ventricular systole and diastole. At the apex, coincidentally with the impact of the apex against the chest-wall and at its site, was heard a soft, blowing murmur. At the aortic cartilage was heard a ventricular systolic murmur, somewhat harsh in character, which was transmitted upward to the root of the neck. The condition was believed to be an adhesive pericarditis, with secondary ventricular dilatation and thickened aortic valves consecutive to degeneration of the aortic intima.
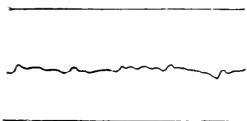
FIG. 3.   FIG. 4.
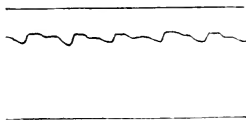
Five drops of strophanthus, thrice daily, were administered, with the result that the dyspnœa was markedly relieved when he reported on the 6th of the following month.

27th. He stated that he had been able to perform much more work without fatigue, and that this pain in the chest was entirely relieved.

December 10. In addition to his treatment, which had been faithfully carried out, he was directed to make use of a claret-glass of Burgundy with each meal. His color was good, his eyes bright, and he felt as well as before his illness.

January 10, 1897. The patient is no longer troubled with dyspnœa, and since the last report has attended to his business without unusual fatigue. The cardiac area is but a finger's-breadth lower than normal and the heart-sounds are of good volume.

CASE III.—Miss A., aged thirty-eight years, suffered from rheumatic fever thirty years ago. For many years she had been prostrated by headaches, which occurred at intervals varying from one to six weeks, which often kept her in bed for twelve to thirty-six hours. She had always suffered from palpitation, dyspnœa, various dyspeptic symptoms, and general nervousness, which had been treated by various physicians, some of prominence, with but temporary relief. Three years ago hyperopic astigmatism was discovered and corrected, and rest in bed with appropriate medication and diet for four months insisted upon. As a result, compensation was established, and for the first time in her life she was able to perform her social duties without headaches or other annoying symptoms. On November 20th, after a series of visits to various summer-resorts, she consulted me for the relief of intestinal symptoms which had persisted for several months. Of the marked physical signs which were present before her treatment three years ago

none remained save the enlargement of the area of cardiac dulness to the left and downward for one and one-half inches, and a harsh, ventricular systolic murmur at the aortic cartilage, and at the same place a ventricular diastolic murmur, which, although not replacing the dulled second sound, was fairly rough in character. The first sound was by no means so loud, prolonged, or booming in quality as at the close of her prolonged stay in bed. Beyond abdominal tenderness and distention there were no physical signs in connection with the diarrhœa.

FIG. 5.
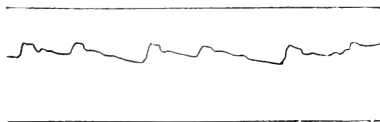
Four drops of strophanthus, thrice daily, were ordered and five grains of bismuth naphtolate after meals.

November 28. The intestinal symptoms have entirely disappeared and the patient can endure more fatigue.

December 6. On coming to my office after a fatiguing morning of shopping she said that she felt dizzy, nauseated, and that her heart palpitated.

The dose of strophanthus was now increased to five drops and caution as to overfatigue enjoined.

16th. Since the last report, although shopping has been persisted in, the patient feels well.

20th. The improvement still continues, the only complaint being dyspeptic symptoms following too frequent and elaborate dinners.

26th. The dyspeptic symptoms are now relieved. The first sound is lengthened, louder, and booming in character. The apex-beat is now vigorous and the first sound has regained its former loudness.

FIG .6.
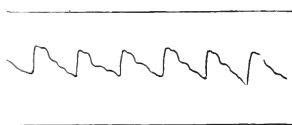
CASE IV.—Miss D., aged twenty-two years, was under my care for several months at the age of sixteen, suffering from diabetes mellitus, which had persisted for three months before coming under my treatment. Although at the outset the sugar was from 4 to 6 per cent. in amount and the patient markedly emaciated, yet it disappeared within ten months, and, with the exception of two occasions of unusual dietary indiscretion, it has never since been found. The patient has regained her flesh and spirits, and indulges in a fair amount of starchy and a limited quantity of sweet food. At times, however, she has suffered from palpitation, cardiac distress, and suffocation, and these attacks are generally justly attributable to fatigue, mental disturbance, or dietary

follies. The underlying physical cause is undoubtedly the degeneration of myocardium, which so generally accompanies saccharine diabetes and so frequently contributes to the fatal termination. On November 5th the patient complained of the above symptoms, due on this occasion to excessive fatigue. Beyond tenderness on pressure over the right hypochondrium, and a slight, soft, blowing, ventricular systolic murmur, heard loudest at the apex, nothing definite was found. This tracing is unsatisfactory, as are the others, because of a deep-lying radial artery in a small wrist.

FIG. 7.
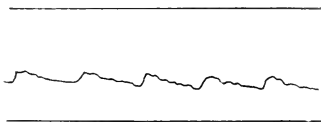
follies. Two drops of strophanthus, thrice daily, were ordered and a moderately strict diet, with confinement to the house, was recommended.

One week later the amount of the drug was increased to three drops at each dose and considerable improvement noticed.

December 7. The patient is again in her usual health and attends to her numerous social duties.

15*th.* The strophanthus is now diminished to two drops, and there has been no palpitation nor suffocative sensations.

FIG. 8.
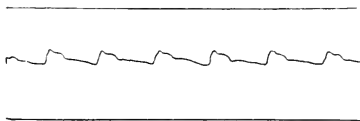
January 4, 1897. There has been no cardiac distress since last report. The murmur has now entirely disappeared, and the dilatation of the left ventricle relieved. The patient is in excellent spirits and claims to be entirely relieved of her symptoms.

CASE V.—Mrs. B., aged sixty-five years, has been dyspnœic on exertion for several years and unable to walk but a short distance and not at all in a strong wind. On November 25, 1896, when I first saw her,

FIG. 9.
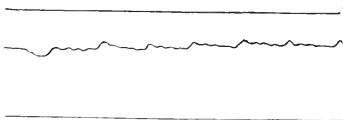
she was confined to her bed, unable to lie down, coughing almost incessantly and panting for breath. On physical examination I found cyanotic lips, swollen feet and ankles, and general emaciation. At the apex, which was displaced downward and to the left, was heard a loud, blow-

ing murmur, synchronous with the impact of the apex against the chest-wall ; the pulmonic second sound was accentuated ; besides dulness from the angle of the scapula downward there was a large number of moist râles of various sorts and sizes. The tongue was extremely foul and heavily coated. The expectoration was profuse, in yellowish, discrete masses and in much liquid.

I administered six drops of strophanthus every six hours and one one-hundredth of a grain of glonoin every two hours. Great relief followed, and after a few nights she was able to lie down.

December 1. The general condition has markedly improved ; sleep is possible for two or three hours at a time, and the appetite has increased slightly.

FIG. 10.
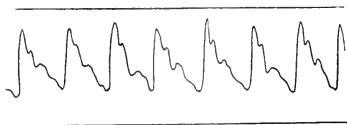
The glonoin is now omitted and the strophanthus diminished to three doses *per diem.*

7th. It was noted that the amount of expectoration had still further diminished and that it was less purulent. The tongue still remains coated in spite of various local treatment. Aqua chlori (U. S. Ph., 1890), in drachm doses well diluted, every two hours was now ordered.

25th. The tongue is now clean ; all symptoms of œdema have disappeared. The chlorine-water is now omitted. The patient sleeps for four or five hours without cough and the expectoration has become less in amount.

January 12, 1897. The dyspnœa is noticeable only on ascending stairs and all symptoms of pulmonary and alimentary congestion have disappeared. The apex is still displaced to the left, but the heart-sounds are distinctly louder.

FIG. 11.
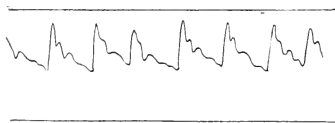
CASE VI.—Mrs. H. B., aged thirty-five years, during the past year has undergone great mental and physical strain. She complains of feelings of suffocation, stabbing pains in the left chest, shortness of breath, palpitation on exertion, and general nervousness. Within the past two years she has grown quite stout. Further questioning elicited the history of various dyspeptic symptoms and that profuse menstruation had resulted in considerable prostration at the time of her periods. December 1st it was found that the apex-beat was slightly moved to the left ; at its site was distinctly heard a ventricular systolic murmur ; there was also a faint murmur heard, at the same period of the cardiac revolution, at the aortic cartilage, and there was an accentuation of the

pulmonic second sound. The feet were slightly œdematous, the lips of good color, but there are no pulmonary signs.

Four drops of strophanthus were ordered and the patient enjoined to remain recumbent during the menstrual epoch.

FIG. 12.
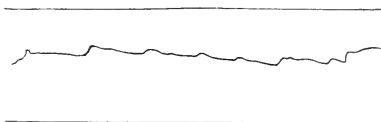
December 8. There has been considerable improvement in the palpitation and general nervousness, the thoracic pain is less, but the breathlessness still continues. For the past three days, during menstruation, she has remained in bed, and the flow is diminished.

29th. The dyspnœa still continues, although the palpitation and nervousness are better than at last report.

January 6, 1897. The dyspnœa has markedly improved and the palpitation and nervousness have disappeared. The murmur at the apex is no longer heard and the pulmonic second sound is normal.

FIG. 13.
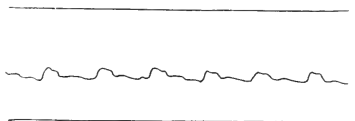
Case VII.—Miss A., aged twenty-four years, a subject of chronic bronchitis with acute exacerbations; there is also found a pleuritic adhesion at the right base behind. She has suffered for several years from palpitation on excitement or on exertion, faintness and excessive nervousness and fatigue easily induced. On November 19 she was excessively pale as to lips and tongue. Her fingers showed enlarged joints. The abdomen was tympanitic, tender to pressure over stomach, and she then spoke of the distress and expulsion of gas, which generally occurred about two hours after each meal. There was found no increase of car-

FIG. 14.
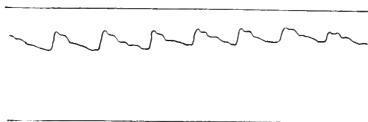
diac dulness. At the aortic cartilage, coincident with the ventricular systole, there was heard a short but harsh murmur; at the apex at the same time was found a faint, dull murmur transmitted upward into the third interspace. The examination of the urine showed a specific gravity

of 1026, excess of urates and chlorides, but no sugar, albumin, peptones, nor bile.

Three drops of strophanthus were ordered to be taken after each meal and two drachms of sodium phosphate on rising in the morning.

December 6. The palpitation and nervousness have improved. The dyspeptic symptoms have lessened, and she has borne more than usual fatigue without lasting exhaustion.

16*th.* There are no longer dyspeptic symptoms or signs. The apical murmur is not heard, while in addition the heart-sounds are louder and approaching the normal in quality.

30*th.* The improvement continues, and it seems fair to conclude that the anæmia was consequent to the circulatory disturbances.

Fig. 15.
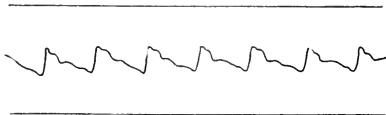
CASE VIII.—Mrs. T., aged forty-five years, has suffered from dyspnœa for about ten years. She also complains of palpitation, pain in back of head, swelling of feet, belching of gas, distention of stomach, and wandering abdominal pains about two hours after eating. During the past year she gained considerably while at rest and under a meat diet and appropriate treatment. This gain, however, was lost during a month's sojourn in Switzerland last summer. When seen on November 2, shortly after her return from Europe, she was intensely dyspnœic, lips purplish, and suffering from palpitation with considerable præcordial distress. The apex-beat was indistinct, and, on account of adipose tissue, difficult to locate. There was heard at its supposed site, coincident with the first sound, a very faint murmur. The sound produced by closure of the aortic valves was not sharp nor distinct. There was distinct tenderness upon pressure over the liver, which was apparently enlarged. The feet and ankles were swollen, especially on the left side. The urine contained a trace of albumin and peptones, was of a specific gravity of 1026, with increased phosphates.   •

Fig. 16.
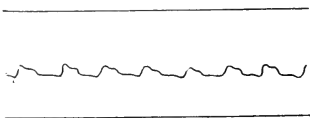
Four drops of strophanthus were ordered to be taken after each meal, a meat-diet prescribed, two drachms of sodium phosphate to be given upon rising, and freedom from her social duties enjoined.

17*th.* It was reported that headache at base of brain was severe on rising in the morning, but that the swelling of the feet had disappeared. The strophanthus was now increased to five drops, thrice daily.

22*d.* The tenderness over the liver was absent, the dyspeptic symptoms markedly ameliorated, and palpitation has only been present upon unusual exertion.

December 15. The dyspnœa is steadily improving and the cyanotic lips are now normal. The apex-beat is more distinct and felt with less difficulty.

18*th.* Within the past three days unusual demands upon the patient's strength have been made and have been met without losing ground.

January 6, 1897. The improvement still continues and the dyspeptic symptoms are completely relieved. The headache has entirely disappeared. The murmur formerly heard at the apex is absent and the aortic second sound sharp and distinct.

FIG. 17
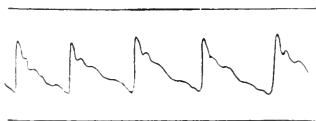
CASE IX.—Mr. H., superintendent, aged forty-five years, generally well, began to lose flesh rapidly as early as February of this year. With this he became breathless, suffered from fainting sensations, headaches, trembling, and generally was unable to attend to his responsible duties. During the summer he took a five months' complete rest in the country, regained about one-half of the flesh lost, and became more cheerful. On November 1 he was noticeably thin in flesh, but with excellent digestion. There was no swelling of the feet or signs referable to the digestive tract. The apex-beat was diffused, displaced outward and in the sixth intercostal space. At the apex and synchronously with its impact is heard a loud, rough murmur; at the same point is heard, with the auricular systole, a harsh murmur shading into the former. The pulmonic second sound is somewhat accentuated; there is nothing noticeable about the aortic.

FIG. 18
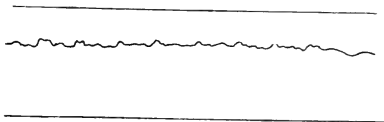
Three drops of strophanthus are directed to be taken after each meal and the importance of a full diet insisted upon. Care in ascending stairs and the avoidance of undue exertion were regarded as important.

November 14. There is a fair gain of weight, and faintness has not been noticed. The headaches and trembling are lessened.

December 13. He has attended to all of his daily duties during the past month and declares that the palpitation is absent. The pulmonic second sound is less accentuated, while the first sound has much improved.

January 3, 1897. The patient is now able to ascend stairs with comfort, attend to his daily duties, and is steadily regaining his customary weight. The murmurs still persist and the first sound is now loud, prolonged, and booming.

FIG. 19.
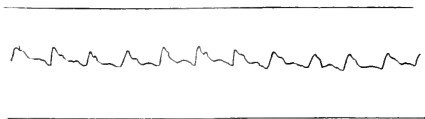
CASE X.—Mrs. C., aged fifty-two years, has been increasing in weight for six years. With this she has found difficulty in getting sufficient exercise, and for the past year her feet have been constantly swollen. Besides she complains of gaseous eructations, obstinate constipation, and that she no longer has any ambition. On November 7th the apex-beat was found to be in the sixth interspace, diffused, and weak. At this point was heard a rough, blowing, auricular systolic murmur. At the aortic cartilage the valve closure was indistinct ; the pulmonic second sound is accentuated. In addition to the œdema of the feet there was marked swelling of the hands and face. The urine was thirty-four ounces in quantity, of a specific gravity of 1027, with increased urea, alkaline phosphates and sulphates.

FIG. 20.
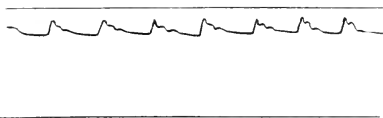
Four drops of strophanthus were directed to be taken three times daily, with five grains of taka-diastase after each meal.

16th. It was noted that the œdema had entirely disappeared, the dyspeptic symptoms were noticeably better, and the patient was enabled to take some exercise.

December 16. The intestinal symptoms having disappeared, the diastase was omitted. The strophanthus was reduced to three drops, and the patient is more energetic.

FIG. 21.
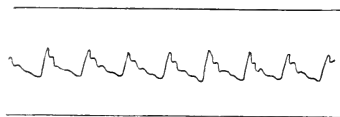
January 11, 1897. The apex-beat is stronger and the pulmonic second sound no longer accentuated. She asserts that she is in her former health and accustomed spirits.

Case XI.—Miss E. F., aged forty-two years, has suffered from vague thoracic pains for several years, persistent headaches, palpitation on exertion, and attacks of unconsciousness. She is pale, of slight build, and thin. Upon physical examination, October 7, there was but little to be found excepting trembling on exertion, apex-beat weak, but in normal position, and a soft, ventricular systolic murmur, heard loudest at the apex.

Fig. 22.
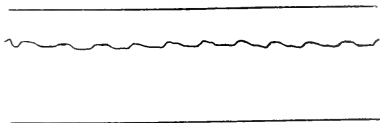
Two drops of strophanthus were directed to be taken thrice daily, a generous diet, and moderate outdoor exercise each day.

17th. There was less complaint of palpitation, lessened headaches, and an improved appetite. The outdoor exercise has been continued every fair day, and there has been no attack of unconsciousness.

November 26. The murmur has now disappeared and there is marked general improvement.

December 15. The trembling has become less and the apex-beat strong, with a coincident improvement in the first cardiac sound.

Fig. 23.
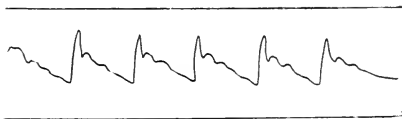
Case XII.—Mrs. E., aged forty-seven years, suffered from acute polyarticular rheumatism about fifteen years ago. Since then she has been subject to palpitation, extreme breathlessness on exertion, occasional attacks of fainting, and almost every night to tormenting dreams. She has lost much flesh and her feet are considerably swollen at night. On October 2d the apex-impulse was found well out in the mammillary line,

Fig. 24.
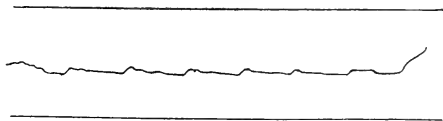
one and one-half inches below its normal position. At the apex is heard both an auricular and a ventricular systolic murmur, the former harsh, the latter soft and somewhat musical. At the second right aortic cartilage is a ventricular systolic murmur, but neither loud nor rough. The first sound is shortened, higher pitched, and metallic in character. The pulmonic second sound is markedly accentuated.

Four drops of strophanthus was given after each meal, two drops at bedtime, and quiet insisted upon.

27th. It was found that the dyspnœa had been greatly benefited and the sleep more peaceful. There had been but one attack of fainting.

November 2. The palpitation was much lessened and general improvement continued. The first sound is of lower pitch, longer in duration, and approaches the normal in character.

December 25. The palpitation is no longer complained of and dyspnœa is noticed only on violent exertion. There has been no fainting during the past month and her sleep has been more free from dreams.

January 6, 1897. The patient now sleeps well at night and all symptoms are markedly better. She is gaining in flesh. The apex-beat is still one inch below its normal position, but the first sound is booming in quality.

FIG. 25.
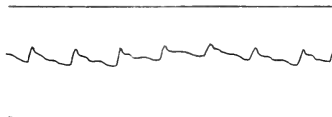
The careful study of these cases, which present the different varieties of cardiac disease, leads me to believe that in them was obtained a more speedy relief of the symptoms than can ordinarily be expected from the use of digitalis or of other drugs commonly used.

Fraser presents a most interesting study of the action of strophanthus upon the heart, finding it eight times more powerful than adonidin, scillitoxin, or erythrophlœin; twenty times more than helleborein, thirty times more than convallamarin, three hundred times more than some specimens of digitalis, and thirty thousand times more powerful than caffein. On the contrary, upon the bloodvessels digitalis acted fifty times stronger than strophanthus.

The advantages which strophanthus possesses over digitalis may be summed up as (1) greater rapidity, modifying pulse-rate within an hour (Potter); (2) absence of vasoconstrictor effects; (3) greater diuretic power; (4) no disturbance of digestion; (5) absence of cumulation; (6) greater value in children; and (7) greater safety in the aged.

When we consider that although digitalis has been in use since 1785 in the treatment of cardiac disease, it is only within the past ten years that it may be truly said that its administration was productive of uniformly excellent results. That this is so is undoubtedly due to the fact that the greatest danger from its use—namely, the marked vaso-constriction —has been to a considerable degree obviated by the common practice of the coincident administration of a nitrite. Strophanthus was first brought to the notice of the French Academy of Medicine in 1865, but its first practical demonstration as a valuable heart-remedy came twenty years later, when Fraser published the results of his long-continued and

patient researches. With the wider and more rapid dissemination of knowledge which obtains at the present day, we may hope that within a comparatively few years we may have strophanthus used as carefully as is digitalis today. That it possesses distinct advantages over the latter drug is undoubted, and it is equally certain that it is free from the greatest danger which the use of digitalis entails—namely, vaso-constriction.

We may say that success in the administration of strophanthus requires: 1. An active, well-made preparation from a reliable source. 2. Avoidance of its use in fully or over-compensated hearts, in those which present advanced muscular degeneration or mechanical defects of high degree. 3. The use of not too large or too frequently repeated doses. From my own observations, the dose of five drops of a reliable tincture three or possibly four times a day is sufficient.

In conclusion, I believe that, considering the limitations just enumerated, strophanthus is the drug of choice in:

1. All cases in which we wish to establish compensation.

2. All case of arterial degeneration in which a remedy which causes more energetic cardiac contractions is required.

3. All cases of cardiac disease where diuresis is necessary.

4. All cases of weak or irritable hearts.

5. All cases of cardiac disease in childhood or old age.

749 MADISON AVE., January 14, 1897.

PERFORATION OF THE INFERIOR VENA CAVA IN AMŒBIC ABSCESSES OF THE LIVER.

By SIMON FLEXNER, M.D.,

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THE accident, for such it must be regarded, described in the title of this paper, judging from the medical literature, is of most infrequent occurrence. My examination of the current text-books and the older authorities on pathological anatomy failed to bring to light even an allusion to perforation of the vena cava as one of the possible complications of abscesses of the liver, and in going through the titles in the Surgeon-General's Library I have been able to find only one instance of this condition recorded. The main facts of this case, which was described by Colin in 1873 (Le Courrier Médical et la Réforme Médicale, tome xxiii. p. 268), are as follows:

The patient, a male, had been ill since the latter part of the year 1871. When first seen in December, 1872, he showed an icteric discoloration of the skin and profound anæmia. He complained of dyspnœa and pain in the right flank, and an irregular elevation of temperature was noted. No history of dysentery could be obtained. The diagnosis of abscess of the liver was ventured. Death occurred in the month of May, 1873.

The autopsy showed an abscess the size of an orange in the right lobe of the liver, situated in the substance of the organ 2 to 4 cm. below the convex surface. It extended to the posterior portion and was surrounded, for the most part, with a pyogenic membrane. This abscess had broken through and communicated by an opening, the size of a franc-piece, with the inferior vena cava. On opening this vessel pus escaped through the incision. No other abscess was present in the liver, but on its superior surface a depressed scar existed which was regarded as due to a healed abscess. The intestines gave no evidence whatever of any old dysenteric process. The lungs, on the other hand, were the seat of several (five or six) abscesses, each the size of a five-franc piece or larger. They were embolic in origin.

The first of our cases was encountered in 1893. The patient was under the care first of Dr. Osler, and later of Dr. Halsted, in the Johns Hopkins Hospital. The clinical history of the case is taken from the hospital records, for which I wish to thank those gentlemen. The patient is a man, aged fifty-one years, a native of this country, and when admitted to the hospital (February 9th) complained of chills, fever, and sweating. He had always been healthy, excepting an attack of ague at the age of ten years; he had been a bartender for fifteen years, and a hard drinker. He admitted having had both syphilis and gonorrhœa. The illness for which he entered the hospital had begun with an attack of nausea and vomiting about two months before admission, although the patient stated that six weeks before he began to experience chilly sensations and to suffer from severe sweating, which came on about three o'clock every morning. On the night before his entrance he had had a severe chill. During the previous two months he had lost from twenty to thirty pounds in weight, and his appetite had gradually failed.

The physical examination showed a large, well-formed man whose complexion was sallow, but who showed no marked signs of cachexia. The pulse was 84, and soft; the bloodvessels a little stiff; the tongue dry and brown. The examination of the thoracic organs was negative. The note relating to the abdomen was as follows:

"Abdomen a little full, symmetrical; veins quite distinct; soft and painless on pressure. The edge of the liver is indistinctly felt at about the level of the umbilicus on the right side, and in the middle line about 5 cm. above the umbilicus; it does not feel prominent, and the edge is not at all distinct. The upper limit of absolute dulness in the midsternal line is at the base of the ensiform cartilage, in the parasternal line at the lower border of the fifth rib; in the mammary line on the fifth rib; in the mid-axilla on the sixth rib; in the nipple-line there are 19 cm. of liver-dulness. Behind there is flatness at the upper margin of the eighth rib. Tenderness exists on deep pressure in the liver regions and along the costal margin. Enlarged glands are nowhere present." The rectal examination was negative, and the stools, which were repeatedly examined, did not show any amœbæ. The blood ex-

amination gave red corpuscles 3,088,000; white corpuscles, 22,500 to the cubic millimetre. On February 10th and 11th the patient suffered from shaking chills, followed by sweating, the temperature reaching to 104.6° F. on the 10th and 103⁵ F. on the 11th.

The diagnosis seemed to lie between abscess and neoplasm of the liver. Dr. Osler was inclined to consider the case one of abscess and advised an exploratory operation, an opinion in which Dr. Halsted, after seeing the patient, concurred. It should be mentioned here that no history of diarrhœa was obtainable until after the operation, when it developed that in the previous summer the patient had suffered from looseness of the bowels, which lasted off and on about four weeks.

The operation was performed by Dr. Halsted on February 16th, and consisted of an incision 14 cm. long, parallel to and about 3 cm. below the costal margin. The liver was found to be free from adhesions excepting a few up under the diaphragm. The surface was smooth and the organ appeared symmetrically enlarged. Aspirating-needles were introduced at various points, at first with negative results. The abdominal wound was then closed and exploratory punctures were made in several of the lower intercostal spaces. Finally, the needle after being introduced in the sixth space, about the anterior axillary line, and passed through the diaphragm and about 5 cm. of the liver-substance, was found to have entered a cavity from which about 20 c.cm. of a brownish pus-like fluid having the appearance of anchovy sauce was aspirated. A second incision, parallel to the first and about 8 cm. above it, was then made and portions of the sixth and seventh ribs were resected. The pleural cavity having been shut off by means of gauze, the diaphragm was incised and the peritoneal cavity protected in a similar manner. A portion of the liver measuring 6 x 3.5 cm. was thus exposed. The operation was interrupted at this point in order to permit of the formation of adhesions. The next day Dr. Halsted incised the liver through the opening and at the depth of about 5 cm. came upon a large cavity from which 1000 to 1500 c.cm. of fluid similar in appearance to that aspirated were evacuated. A large drainage-tube was introduced and the wound packed with iodoform-gauze.

The patient did well until the 25th instant, eleven days after the second operation, when he had a severe hemorrhage into the wound from which he never recovered, death taking place on February 27th.

Dr. Thayer examined the fluid aspirated on the first day and also that obtained the next day at the second operation. His report is as follows : "The fresh specimen contains no well-preserved cells of any sort, but merely a granular débris. In three or four stained specimens not a single well-preserved cell was found ; however, an occasional more or less broken-up liver-cell was seen, but never any leucocytes. Neither bacteria nor amœbæ were discovered in these specimens. The contents of the abscess evacuated at the operation show a similar composition to those obtained by aspiration. Bacteria were not found in cover-glass preparations, nor were cultures more successful. After some search I found, in the fresh material, a number of quite actively motile amœbæ showing every characteristic of the amœba coli. I am inclined to think that the nature of the fluid-contents of the abscess might have justified us in strongly suspecting the abscess to have been of amœbic origin, even had amœbæ themselves not been found."

The autopsy was performed twenty-two hours after death. Such extracts only from the protocol are given here as are germane to the case, and are not covered by the clinical history :

The peritoneal cavity was entirely normal in appearance; the pleural cavities likewise were normal. The liver weighed 2600 grammes; its dimensions were 25 x 14 x 5.5 cm. The right lobe contained a funnel-shaped cavity which occupied a position near the anterior edge, 5 cm. distant from the superior border. In its widest parts this cavity measured 4 cm. in diameter and led directly into a cavity in the substance of the right lobe of the liver the size of an orange. Surrounding the edges of the cavity on the anterior surface of the organ moderately fresh adhesions, easily broken down, existed which united this surface with the abdominal parietes. The walls of the abscess were composed for the first 3 cm. of liver-tissue the inner surface of which was covered with necrotic material and pus, and posteriorly by a dense and more fibrous tissue covered with similar material. The deepest part of the cavity is the largest, measuring 10 cm. in its greatest diameter. The inferior vena cava passes directly across the upper portion of this cavity, and at a point 2 cm. from the superior border of the liver it is occupied by a thrombus which about half fills its lumen. On removing the thrombus two perforations, one the size of a split-pea, the other of a poppy-seed, were disclosed. These led directly into the cavity in the liver. For a distance of 5 cm. the adventitial coat of the vena cava was in contact with the abscess and assisted in the formation of its posterior boundary wall. The abscess reached the superior surface of the liver at the most posterior part and below impinged upon the right adrenal gland and superior surface of the kidney. The right lobe of the liver contains as many as a dozen smaller abscesses, ranging from a hemp-seed to a walnut in size, of which the larger ones were filled with gelatinous pus and limited by a capsule averaging 1 mm. in thickness; the smaller ones showed either softening or merely a yellow necrosis. The gall-bladder contained a blood-clot the size of a duck's egg. The intestine was free from ulcerations, but several pigmented and somewhat depressed spots existed in the large intestine, and in the ileum, about 50 cm. above the ileo-cæcal valve, a puckered area 1 cm. in diameter was also present. The microscopic examinations of sections from these parts showed the normal structures of the mucosa. No evidence of previous ulceration was made out. Each lung contained an embolic abscess. The larger, the size of a pigeon's egg, was located in the upper lobe of the left lung. The branches of the pulmonary artery (the largest the size of a goose-quill) going to this area were occupied by a partially softened thrombus.

The examination of the fresh contents of the abscess-cavity at the autopsy showed living amœbæ in moderate numbers. Several varieties of bacteria were also present. The smaller abscesses and necrotic areas contained streptococci in pure culture. Amœbæ were not found in these. The pulmonary abscesses were of streptococcus origin.

The second patient was a male, aged forty-two years, who dated his illness from September, 1895. He began at this time to have regularly recurring chills and fever, followed by profuse sweating. His condition did not improve during November and December, and from the last week in the latter month he had kept his bed constantly. On January 2d he began to suffer from a cough, and the next day he noticed that

the expectorated matter was tinged with blood. He was admitted to the hospital on January 7, 1896.

The physical examination at this time disclosed enfeeblement of breath-sounds and râles over the right lung; the liver was apparently not enlarged, nor was it sensitive even on deep pressure. The expectoration had the appearance of anchovy sauce, and upon microscopic examination showed, besides pus-cells, red blood-corpuscles, and epithelial cells, distinctly motile amœbæ and crystals believed to have been bilirubin. The fecal matter obtained by means of the rectal tube did not show amœbæ. No history of a previous dysentery could be obtained, with the exception of an attack of diarrhœa lasting some three days, from which he had suffered late in November. The note of January 22d, by Dr. Osler, is as follows: "Expectoration of the same character as previously noted; the patient has not had a chill since admission; temperature still irregular, occasionally reaching normal, but extending as high as 105° F. In the right axillary line the dulness reaches 12 cm. in the vertical direction; nowhere any signs of a cavity." On February 1st the patient was taken with sudden pain in the right side and immediately complained of dyspnœa and oppression. On examination the next day Dr. Thayer noted fulness and immobility of the right chest, increased vocal fremitus, and on percussion general wooden flatness. He was transferred to the surgical ward, and the sixth rib on the right side resected by Dr. Bloodgood. A large quantity of pus of a pale-brownish color was evacuated. The temperature continued elevated; the discharge from the opening was profuse, and there was much shortness of breath. Amœbæ were first found in the discharges obtained by means of the rectal tube on February 4th, and on the 9th instant diarrhœa set in, the patient having eleven movements on that day. Numerous amœbæ were found in the discharges obtained by means of the rectal tube on the 10th. The patient grew very feeble and died at 5 P.M. on the same day.

The autopsy was made three hours after death. The most important findings were as follows: with the exception of the dense adhesions which bound the liver to the diaphragm, the peritoneal cavity was normal. The liver was not enlarged, its inferior edge extending only a finger's breadth below the costal margins. The right lobe of the liver contained an abscess which was in direct communication, through the diaphragm, with a cavity in the right lung. The two together in their several diameters measured 19 x 14 x 9 cm. There was a large defect in the diaphragm corresponding with the opening, and to the edges bordering upon it the liver below and the lung above were adherent. The contents of the abscesses consisted of a thick, grayish, necrotic-looking material, rapidly disintegrating, intermingled with which was a softer, anchovy-sauce-like fluid. The walls of the cavity were dense and fibrous, with an inner lining of soft, necrotic, partly purulent material. The part of the abscess within the liver extended backward to the capsule of Glisson, and in front was separated from the surface by a narrow zone of liver-tissue. This abscess was, indeed, not entirely limited posteriorly by the thickened capsule of the liver, for it involved the adventitial coat of the inferior vena cava and had ruptured into this vessel near the point of entrance of the hepatic veins. The opening measured 1.5 mm.; about it the intima of the vessel was lifted up, and upon exertion of the least pressure a grumous yellowish-red material

passed into the vessel. The inferior cava, beginning at a point just above the rupture, contained an occluding, partly decolorized, firm and adherent thrombus, which extended upward and projected into the right auricle, filling about one-third of it. Some of the main hepatic veins also contained thrombi which were firm and decolorized in the upper, and red and soft in the lower portions. The main abscess in the lung was limited to the lower lobe, the middle and upper lobes having been compressed. The pleura was covered with a yellow, opaque pseudo-membrane; it was quite free from any accumulation of fluid. The point of perforation of the pleura was not discovered.

The small intestine showed only congestion and a few small areas of ecchymosis, chiefly in the mucous membrane. The large intestine, on the other hand, was the seat of many ulcers, which, for the most part, did not reach the size of a bean. They were within the mucous membrane or at most projected very superficially into the submucosa. They were quite regular and smooth, not undermined, and covered with sticky, pus-like contents. The majority were in the cæcum and upper colon; they were fewer and well separated in the sigmoid flexure and rectum.

The fresh material taken from the abscess common to the liver and right lung and from the intestinal ulcers showed many living and amœboid amœbæ. The left lung contained many small abscesses, presumably of embolic origin, and the left lobe of the liver two or three, of which no one was much larger than a split-pea. In none of these were amœbæ found. On the other hand, they, as well as the large abscess, contained cocci in clumps. The bacteriological examination revealed the staphylococcus pyogenes aureus in these situations, as well as in the blood of the heart and organs generally.

I shall refrain from all discussion of these cases except to draw attention to two points of more than ordinary interest. The first is the existence of an amœbic abscess of the liver without intestinal lesions, which seems not to have had any necessary relation to the disease, since the depressed area described in the intestines in the first case showed very little that was abnormal upon microscopic study. The second is the probability that the intestinal lesions, far from being the necessary precursors of those in the liver and later in the lung, appear in the second case to have followed infection from above. The acute character of the intestinal ulcerations agrees so well with the appearance of the acute dysenteric attack upon the day before the patient's death that I am constrained to regard them as of very recent development. It will be recalled that the feces were repeatedly examined for amœbæ with negative results until February 4th, when they were first found, and on the 9th, when diarrhœa set in, they were present in large numbers. As to the mode of infection, what one would at first think of would be the biliary passages and the bile.

HABIT—CHOREA.

By Wharton Sinkler, M.D.,
of philadelphia.

Gowers considers the term " habit-chorea " a misnomer, and regards the affection as a form of spasm or tic, rather than a variety of chorea. The same view is taken by several other writers. Many authors, among whom are Strümpell, Hirt, and Gray, do not mention the disease at all. Weir Mitchell, who described habit-chorea in 1881,[1] gave the following reasons why he regarded the affection a form of chorea : first, the fact that it usually occurred in children ; secondly, that in cases of habit-chorea there is generally a history of some fall from the plane of health, and a state of irritability and nervousness ; the circumstance that, in some instances, habit-chorea lapses into well-pronounced chorea of the ordinary type ; and, finally, that the same remedies which are most useful in Sydenham's chorea are of the greatest value in habit-chorea. The largely attended clinical service at the Philadelphia Infirmary for Nervous Diseases has given me the opportunity of studying an unusual number of cases of habit-chorea, and the result of this observation has confirmed my belief that Mitchell's view as to the nature of the affection is correct. There are undoubtedly cases to which the term habit-spasm is correctly applied, and I believe these cases are properly classed with the different forms of tic. I think that the differences of opinion as to the disease are mainly due to the fact that there are two varieties of habit-chorea. The first is one in which the disease is evidently the result of a trick or habit in a child or adult, while in the second class the affection is due to some predisposing cause, such as is operative in the production of Sydenham's chorea.

The movements in both forms are much alike in character and extent. In both the irregular movements and spasmodic twitchings are like those of chorea minor, but are confined to a limited region of the body. They cease during sleep, are increased by excitement, and may or may not be controlled by an effort of the will. The movements in habit-chorea are unlike the spasmodic twitchings which occur in the different varieties of tic, and this difference may be notably seen by comparing a case of facial tic (tic convulsif) with a case of habit-chorea which affects the upper facial muscles. In habit-chorea the onset may be abrupt or gradual, and the irregular movements are confined to one portion of the body. In the majority of cases the region selected is the face. The spasmodic twitchings occur at intervals sometimes of a few minutes, or the intervals may be so short that the movements are almost incessant. There

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[1] Lectures on Diseases of the Nervous System. Lecture VIII.

may be blinking of the eyes, or a sudden contraction of the orbicularis palpebrarum, or depression and elevation of the eyebrows may occur. A common symptom is contraction of the zygomatic muscles, moving the angles of the mouth first to one side and then to the other. Movements of the head often occur, such as rotation and nodding, or jerking the head backward. In other cases there is shoulder-shrugging. More rarely leg-movements occur, such as the sudden extension of the leg and irregular contraction in the thigh muscles, which may occur in walking, giving rise to a gait like that of a " string-halt " horse. In other cases the respiratory muscles are involved, and various disordered sounds are emitted by the patient. Sometimes these sounds are merely slight grunts, in other cases there is an irregular hacking cough, and occasionally an explosive utterance is made, which may be loud and annoying. Gowers relates a case which began with irregular laryngeal sounds, lasting two years, at the end of which time the whole left half of the body became affected with choreic movements, and these lasted for a year, when complete recovery took place.

Some of the forms of habit-chorea, especially those which arise from a trick, are very odd. One patient at the infirmary, a girl, aged sixteen years, who had had a previous attack of chorea minor, acquired the habit of rubbing the toe of her shoe against the calf of the other leg. This would occur while walking. She would stop for an instant and rub the toe against the calf of the other leg, and then go on as if nothing had happened. Another case, which Dr. T. G. Morton kindly sent to me, had had a habit for about three years of rubbing the eyebrows. She began first to rub the brows on account of slight itching, and soon acquired the habit of rubbing the brows whenever not occupied with her work or otherwise. If she was reading, the brow-rubbing was almost continuous, and, as a result, the eyebrows on both sides had been as completely removed as if they had been shaven. A curious form of this affection came on in a little boy of five, who began by imitating the movements made by the motorman of a trolley car, and it soon became a habit which required some effort on the part of the parents to break. He would stand with his back to a door, first swinging around one arm, then the other, and would make an explosive utterance. A very singular case was that of a boy of twelve years, two of whose aunts had suffered from a form of habit-chorea. The boy began two or three months before he was seen to make choreic movements of the toes. He would twist the toes over each other, and untwist them continuously. The toe-movements continued for several weeks, when they ceased, and similar movements began in the fingers. He kept up the finger-movements for a couple of months, when they ceased, and he began to make movements of the mouth and neck muscles. When the patient was seen the mouth was opened and shut at intervals, and the platysma on either

side was thrown into irregular contractions, drawing the chin downward and upward. The head would be occasionally thrown backward, and there was a condition of general unrest. In some cases the habit seems to acquire the form of an imperative mandate, the patient resisting the impulse to perform the act for some time, and finally being obliged to yield to it.

Often habit-chorea arises from nasal disease, which gives rise to sniffling or distortion of the facial muscles. In the greatest number of cases, however, some ocular defect, either as a refraction-error or disease of the lids, is responsible for unnatural blinking, orbicularis contractions, or movements of the upper facial muscles. It is not infrequently the case that muscles over which there is not usually voluntary control, such as the occipital frontalis and ear muscles, are affected with involuntary movements which seem to have originated in voluntary movements by the patient. I have seen two or three cases in which contraction of the occipito-frontalis caused active twitching of the scalp, and I know a case in which the ears are moved in sympathy with nasal sniffling and contraction of the facial muscles. One evening at the theatre I sat behind a lady whom I knew to have chorea of the occipito-frontalis. She wore a bonnet in which there was an ostrich feather, and with every movement of the scalp there was an extensive waving of plumes. Two patients of mine acquired a choreic movement of the shoulders as a result of first wearing suspenders. A sensation as if the suspender were falling off caused shrugging of the shoulders, and this movement persisted for years. In several other instances a tight collar was responsible for the beginning of the habit. In the other class of cases, in which no trick or habit is responsible for the affection, the movements are simply those of chorea minor, but are limited to the face, the shoulders, or, perhaps, the leg.

With the assistance of Dr. Frank Savary Pearce I have made an analysis of all the cases of chorea which have been treated at the Philadelphia Infirmary for Nervous Diseases from June 9, 1876, to April 15, 1896. During this period 1059 cases of chorea have been treated at the clinics, of which 143 were recorded as cases of habit-chorea, and the vast majority of the remainder were chorea minor. Previous to the description of habit-chorea by Dr. Weir Mitchell, in 1881, all cases of chorea coming to the infirmary were recorded under one class; but a careful *résumé* of all cases, and the subsequent histories which have been obtained, have enabled us to include almost every one in which a habit-chorea existed alone or which occurred as a sequela of true chorea minor.

In dispensary practice it is impossible to obtain satisfactory data as to the result of treatment. As soon as the patient recovers, or, in fact, when marked improvement has taken place, he usually ceases to attend, and it is only when a patient returns with a second attack of the affec-

tion that anything is known of the result of previous treatment. We have sent a large number of postal cards to cases of chorea, asking them to return to the hospital for further examination, but only about a dozen cases have reported. A large number of postals were returned, so it is presumable that the majority of patients have changed their addresses. It is fair to assume, however, that many of these patients have recovered or have outgrown the conditions for which they came for treatment.

Age at onset of the affection. In 2 of the 143 cases of habit-chorea the age was not noted. The age of the remaining 141 cases is given in tabular form, as to the age and percentages :

Age.	No. of cases.	Per cent.		Age.	No. of cases.	Per cent.	
1 year.	2	about	1.50	13 years	14	about	10.50
2 years.	2	"	1.50	14 "	5	"	3 50
3 "	4	"	3	15 "	1		
4 "	4	"	3	16 "	4		
5 "	10	"	7	17 "	2		
6 "	8	"	5.50	18 "	1		
7 "	10	"	7	21 "	1		
8 "	16	"	11.50	25 "	1		
9 "	15	"	11	37 "	1		
10 "	12	"	5 50		——		
11 "	17	"	12	Total,	141		
12 "	11	"	8				

Studied by hemi-decades the onset of the affection was found to have occurred

During the first hemi-decade in	.	.	.	.	22 cases.
" " second hemi-decade in	.	.	.	.	61 "
" " third " "	.	.	.	.	48 "
" " fourth " "	.	.	.	.	7 "
" " fifth " "	.	.	.	.	3 "

No case in our series began after the age of thirty-seven years. It will be seen, then, that of the 141 cases, 109, or about 77 per cent., began during the ages of five and fifteen years.

Duration of the disease before the patient reported for treatment. This ranges from a few weeks to from three to five years. In a few cases the disease had lasted for as much as nine years before the patient was seen.

Relation to sex. The affection seems to have but little predilection for sex. Of the 143 cases, 74 were males and 69 were females.

Heart-lesions. In 32 cases cardiac murmurs were noted. It is probable that a careful examination was not made for heart disease in the examination of all cases, for the absence of cardiac disturbance was not always noted. In the cases in which heart-trouble was recorded, in 19 soft systolic murmurs were heard over the mitral area, and were feebly transmitted, if at all. In 1 case a loud systolic murmur was noted.

This case had also a pulmonary murmur. In 3 cases pulmonary systolic murmurs were heard. In 6 cases aortic systolic murmurs were heard, and in 2 cases aortic regurgitant murmurs were present. In 1 case there was mitral stenosis. Anæmia is not so frequently present in habit-chorea as it is in Sydenham's chorea, and, therefore, fewer hæmic murmurs are heard.

Influence of volition. In most cases voluntary effort controls the movements temporarily, and the patients usually show less movement during the attention required of them while the recording of their histories than do cases of chorea minor.

Seasonal relations. The season of year seems to exert little or no influence upon the production of habit-chorea. In 106 cases the incipiency of the disease was noted. In these 34, or 32 per cent., began in winter; 23, or 22 per cent., began in spring; 28, or 26 per cent., began in summer; 21, or 20 per cent., began in autumn.

Occasionally one meets with cases in which there is a tendency to recurrent attacks in the spring. Dr. G. E. de Schweinitz had a patient in whom an attack of habit-chorea returned every March, until its recurrence was anticipated by the administration of arsenic, and thus prevented.

Supposed causes as given by patients or friends. In only 63, or 44 per cent., of the cases was a cause assigned or determined. The causes given are as follows:

Anal fissure	.	.	1	Injury	.	.	2
Bathing excessively	.	.	1	Irregular menstruation	.	1
Collars too tight	.	.	2	Overeating	.	.	1
Cholera infantum	.	.	1	Physical overwork	.	.	2
Coffee in excess	.	.	2	Overwork at school	.	.	13
Domestic trouble	.	.	1	Smoking	.	.	1
Fright	.	.	.	12	Surgical operation	.	1
Grippe	.	.	.	2	Swimming	.	.	2
Habit or trick	.	.	4	Suspenders	.	.	1
Imitation	.	.	.	6	Teeth decayed and cutting	3
Infectious diseases	.	.	5				

In one case, which was alleged to be due to fright, the patient had had an attack of chorea minor six months previously. In two cases in which the disease seemed to have originated from dental irritation, in one the patient was cured after the filling of the teeth, and in another after the eruption of the teeth. In the case of a woman who had for many years habit-chorea the affection ceased during pregnancy, to reappear after childbirth.

Parts most commonly affected. The eyelids are most frequently involved, then the facial muscles, and next the head and neck. Sudden, general twitching or jumping of the electric type is the most rare form. Below

is given in tabular form the number of times different parts were affected in the cases recorded:

	No. of cases.	Per cent.
Eyes alone and combined 72	72	about 18
Mouth or tongue 37	37	" 9
Face and nose (as grimace, snuffing, etc.) . . 54	54	" 13
Scalp 6	6	" 1
Neck and head 56	56	" 14
Stammering or disordered speech 16	16	" 4
Shoulders 35	35	" 8
Hands 26	26	" 6
Arms 36	36	" 9
Feet 15	15	" 4
Legs 25	25	" 6
Jumps or stops suddenly (electric) . . . 2	2	" 0.18
"Grunts" 3	3	" 0.36
Rotation of trunk 4	4	" 1
General 2	2	" 0.18
Total number of parts actively involved	387	100

Optical defects. In many of the earlier cases no examination of the eyes was made for refraction-errors, but of the recent cases 49 were carefully examined by Dr. G. E. de Schweinitz and Dr. A. G. Thomson, to whom I am indebted for the careful study of the ocular defects in these cases. The report of these gentlemen gives the following disturbances of the eyes: 15 cases of hypermetropia, with astigmatism, 2 of which were complicated by conjunctivitis, due to eye-strain ; 2 cases of myopic astigmatism ; 2 cases of uncomplicated astigmatism ; 20 cases of simple hypermetropia ; 2 cases of simple myopia ; 2 cases of conjunctivitis ; 6 cases of defects in ocular balance. Of the 49 cases 8 were apparently cured by glasses. Many do not accept the advice to have glasses fitted, and many did not report the result of treatment.

Effects of school in causing habit-chorea. Of the 143 cases of habit-chorea, in 35 it is recorded that the patients were attending school. It, therefore, seems that, like chorea minor, many cases of habit-chorea are school-made.

Relation of habit-chorea to Sydenham's chorea. In 9 cases attacks of chorea minor had preceded the habit-chorea, and 2 cases of habit-chorea coexisted with an attack of Sydenham's chorea.

Nasal irritations. Obstructive diseases of the nose were found to be common complications, and are to be regarded as causes by favoring facial movements. Two or three cases were cured by nasal treatment.

In one case hypertrophy of the turbinated bones and in another case enlargement of the tonsils were noted as probable causes. In one case epilepsy coexisted, and in two cases night-terrors occurred. In many

cases there was anæmia, but this condition was not so common as it is in chorea minor.

Prognosis. The prognosis in this affection depends largely upon the length of time it has lasted before the patient is seen. In a great proportion of cases, if seen early enough, the disease may be completely and permanently cured. In adults in whom the disorder has lasted for some time it is difficult, if not impossible, to arrest the movements. All of us are familiar with instances among our acquaintances which we have observed for many years, and which appear to be a fixed and permanent part of the individual. Habit-chorea has a tendency not only to become uncontrollable the longer it lasts, but also to increase its range and involve other groups of muscles.

Pathology. There is no proof that any lesion exists in the brain or spinal cord in these cases. It is probable that the groups of nerve-cells which supply the affected muscles acquire a habit of discharging at irregular intervals independently of any control of the will.

Treatment. The majority of cases depend upon some distinct and positive cause, which careful investigation will usually discover. It is essential, therefore, in every case to determine the existence of a cause, and to take measures for its removal. In cases of long standing, however, it is not sufficient merely to get rid of the cause, for the nerve-centres having acquired a vicious habit do not recover their normal condition until systematic treatment has been pursued. This is especially observable in those cases in which habit-chorea has resulted from an error of refraction. The experience of de Schweinitz and Thomson has entirely coincided with my own in this respect. It has been found that medicinal treatment alone seldom arrests the choreic movements. On the other hand, mere correction of the refraction does not cure them. It is necessary, therefore, first to correct the ocular defect, either by glasses or tenotomy, and then to pursue a course of medicinal treatment. The same statement applies to those cases in which nasal or throat disease has been the cause of the affection.

In nearly all cases the general health is at fault. The patient is anæmic, or he is run down from overstudy, improper food, or some attack of illness. The point of first importance, then, is to look carefully after the general health. Tonics, more especially chalybeates, should be administered, and, if possible, change of air is to be obtained. In school children it is usually necessary to stop study for a time.

The one drug which seems to exert a special influence upon the disease is arsenic, and it should be administered in the same manner as in the treatment of chorea minor. It is seldom of value when given in small doses, but it should be administered in gradually ascending doses until some toxic influence is observed.

Many years ago Weir Mitchell called attention to the fact that some

cases of habit-chorea which were not relieved by the internal adminis-
tration of arsenic were cured by its exhibition hypodermatically, and
this method of treatment continues to be successfully used at the Phila-
delphia Infirmary for Nervous Diseases.

The question as to whether the patient should be urged to control the
movements by an effort of the will, and also as to whether in the case of
children any form of punishment should be used, are mooted points.
My own belief is that in all cases the patient should be induced to bear
continually in mind the occurrence of the irregular movements, and
to make every effort to check and control them. Any form of punish-
ment for the movements in children is to be deprecated, but in every
case much can be done by the promise of reward. In almost every child
who is suffering from habit-chorea much benefit will be derived from
offering a premium whenever the movements are controlled for a certain
length of time.

In all cases it is important to secure as quiet and uneventful a life as
possible, and removing the patient from work or exciting sports is neces-
sary in many cases. The most speedily beneficial results are obtained
by a modified course of rest-treatment. I have frequently seen cases
which resisted the ordinary course of medicinal treatment at the clinics
make rapid improvement when admitted to the hospital and placed
in bed.

A PIECE OF STEEL IN THE CILIARY BODY LOCATED BY MEANS OF ROENTGEN'S X-RAYS.

EXTRACTION WITH THE ELECTRO-MAGNET AND PRESERVATION OF GOOD VISION AFTER TWO SIMILAR OPERATIVE PROCEDURES, WITHOUT THE USE OF THE RAYS, HAD BEEN UNSUCCESSFUL.[1]

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SINCE the report of the interesting case of extraction of a bit of
copper from the vitreous (where X-rays helped to locate the metal) by
Charles H. Williams,[2] of Boston, the equally interesting record of the
localization by the same aid of a minute fragment of steel, and its suc-
cessful extraction from the vitreous with the electro-magnet, published
by Dr. C. F. Clark,[3] of Columbus, Ohio, as well as the cases of Dr.

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[1] Read before the Section of Ophthalmology of the College of Physicians of Philadelphia,
February 16, 1897.
[2] Transactions of the American Ophthalmological Society, 1894–'96, vol. vii. p. 708.
[3] Ibid., p. 711.

Howard F. Hansell[1] and Dr. G. Oram Ring,[2] already reported to this Section, all doubt as to the value of radiography to the needs of the ophthalmic surgeon has passed away.[3] How largely we are indebted to the faithful labors and skilled technique of Dr. Max J. Stern, of the Philadelphia Polyclinic, has already been referred to and commented upon by Dr. Hansell in his several communications on this subject. To this series of cases I desire to add the report of another recently under my care, which, in addition to the interesting features surrounding the use of the Roentgen ray, presents other points of clinical importance.

Frank McD., aged nineteen years, single, machinist, consulted me on January 13, 1897, on account of an injury to his left eye.

History: Twenty-seven hours before his visit, while working around an engine and sledging upon some portion of the machinery, he was struck in the left eye with a chip of steel which flew from the piece of metal on which he was striking, the blow having been delivered in an upward direction. The foreign body entered through the sclera at the lower and inner quadrant of the eye. The patient was immediately taken to a neighboring hospital, where an electro-magnet was twice introduced through the wound of entrance, without, however, removing the foreign body. The physician in charge of the operation stated that he thought he had moved the body, but that his magnet was not strong enough to withdraw it. The patient, by the advice of Dr. John Fay, then came to Philadelphia with the hope of obtaining relief.

Examination: Vision of R. E., 6/6, full accommodative power, practically normal fundus, H. equals 1 D. Vision of L. E., 5/60, with difficulty. The pupil was dilated widely, probably from the effects of atropine, the tension was diminished, the bulbar and tarsal conjunctivæ were flushed, and a small bead of vitreous protruded from a linear wound 3 mm. in length, situated ½ centimetre from the corneal border, downward and inward, between the insertion of the internal and inferior rectus.

Ophthalmoscopic examination was unsatisfactory, on account of the haze in the vitreous, which prevented accurate observation of the details of the fundus. As far as could be made out, however, these included a vertically oval disk, enormously distended and tortuous veins, a patch of white tissue upon the nasal side of the disk, a fringe of hemorrhage downward and outward from the papilla, and far forward in the upper portion of the eyeground an indistinct spot of dark color, vaguely resembling a blood-clot, but very difficult to study. The lower half of the vitreous was filled with large blood-clots, through which could be seen dimly the rent in the coats of the eye.

The next day, January 14th, an electro-magnet was introduced twice, unsuccessfully, through the wound of entrance. Thinking that the small, dark spot in the upper portion of the eye might indicate the position of the foreign body, the fine, straight point of a Hirschberg magnet was

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[1] Two cases reported to the Section of Ophthalmology of the College of Physicians of Philadelphia.

[2] Codex Medicus, February, 1897.

[3] I have not included reports on this subject from foreign journals. Interesting papers will be found by Van Duyse, Archives d'Ophthalmologie, February, 1896, and by H. Lewkowitsch in London Lancet, August 15, 1896.

inserted through a small wound made for this purpose in the upper ciliary region. Once a bystander thought he heard the click of metal on metal, but on withdrawal of the point no foreign body was attached. The incision was small—not much larger than was necessary to admit the point of the electro-magnet ; therefore it is possible that the foreign body could not have passed between the lips of the wound without

FIG. 1.
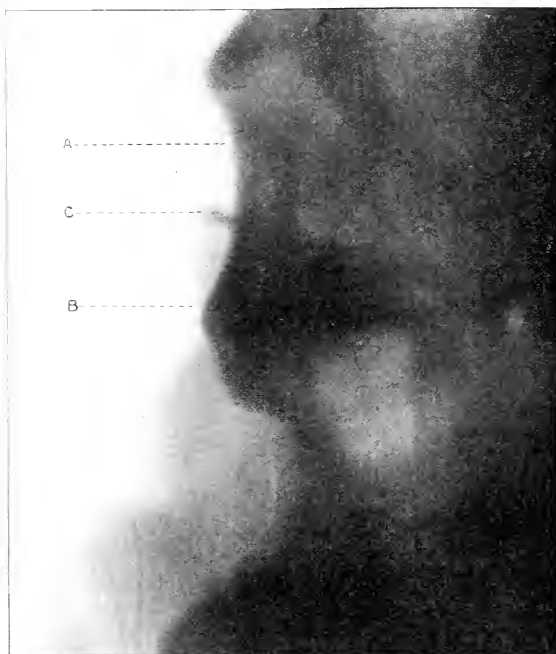
A–B, outer margin of orbit   C, foreign body. The plate was placed against the left temple ; the light was directed into the eye obliquely from the nasal side. In the negative the lens can be dimly seen below C, but this does not show well in the reproduction or in the print. Exposure four minutes.

being detached from the magnet. I am inclined to think, however, even if the point of the instrument did touch the piece of steel, that the magnetic attraction was not sufficiently strong to dislodge it, because the mouth of the wound was carefully watched by Dr. Veasey and its sides separated by small retractors. Further operative interference at that time was not deemed justifiable.

No immediate reaction followed this operation. The boy was kept under observation for ten days, seven of which he spent in the hospital. Small doses of calomel and iodide of sodium were administered and mydriasis was maintained with atropine. This treatment was instituted in the hope that some absorption of the vitreous exudations and blood-clots would take place and enable a more perfect ophthalmoscopic examination to be made. In this hope I was disappointed, because the vitreous haze deepened, and on the seventh day the signs of beginning cyclitis were well marked.

In the meantime, however, and as soon as possible, through the kindness of Dr. Max J. Stern, an excellent skiagraph was obtained, which is herewith exhibited, chiefly interesting because, in spite of the fact that the current gave out and the exposure was only four minutes, the points are well shown—namely, the malar bone, the outer edge of the orbit, the shadow which represents the position of the eye within the orbit, and the linear foreign body in its upper portion.

The radiograph indicated that the position of my first magnet-operation in the upper ciliary region was correct, and that had I proceeded further, or had the magnet been more powerful, I probably would have secured the body; therefore a triangular flap of conjunctiva was raised and a curved incision, 8 mm. in length, was made through the sclera in the upper ciliary region, about midway between the insertion of the superior rectus and the corneal margin. The flat point of a large electro-magnet, kindly loaned for the purpose by Dr. Sweet, as it was more powerful than my own instrument, was introduced and almost immediately the foreign body was withdrawn—a body which is 4 mm. in length, 2 mm. in breadth, and weighs $\frac{7}{16}$ grain.

FIG. 2.
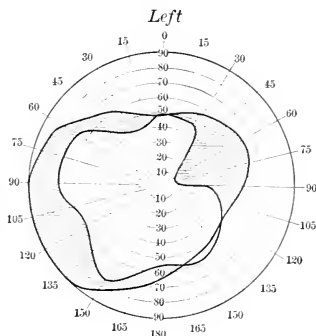
The eccentric continuous line indicates the average normal field; the inner continuous line is the boundry of the patient's field measured with a 1 centimetre square of white; the shading shows where vision is lost.

After thorough cleansing of the eye the conjunctival wound was closed with three interrupted silk sutures. No stitches were passed through the sclera. A light antiseptic dressing was applied, which was kept cold by means of iced compresses for four days; internally, calo-

mel was administered. No signs of irritation occurred. The symptoms of iritis and cyclitis rapidly subsided, and on February 6th, or twelve days after the operation, the patient returned home, his vision with his correcting cylinder $+ 1$ axis $V = 6/12 =$.

At this time there were fine, web-like opacities through the vitreous, a small pear-shaped streak of lenticular opacity up and in, and a large rent in the choroid downward and inward, representing the original wound of entrance and the position of the two previous operations. The iris was slightly discolored, the disk-edges were hazy, the veins were full and tortuous, but all hemorrhages had been absorbed and the macula was normal. The field of vision is given in Fig. 2. The right eye was sound in all respects.[1]

Commenting on this case, it may be said that it is evident that the dark spot seen dimly through the haze in the vitreous and located in the upper ciliary region was the foregin body, and that had the second electro-magnet operation, which was planted exactly in this position, been a little more persistent, or, rather, had the magnet been more powerful, the foreign body might have been extracted. It was, however, because of the uncertainty of this localization that operative procedures were discontinued, in the hope that treatment, as Dr. E. Jackson has well shown in a recent paper, might clear the vitreous sufficiently to permit accurate ophthalmoscopic examination and accurate localization. The confirmation by means of the radiograph of the situation of the foreign body, corresponding exactly to the position inferred from previous examinations, destroyed all hesitancy as to extensive operative procedures, with the result which has been recorded. It seems to me a very interesting circumstance that an eye can sustain such great traumatisms and still heal with useful vision.[2] These traumatisms consisted of those produced originally by the entrance of the foreign body and its lodgement in the ciliary body; those caused by the immediate introduction, twice, of an electro-magnet; those caused at my first electro-magnet operation, when the points were introduced both through the wound of entrance and through a new opening; and, finally, those produced by the successful electro-magnet extraction through a cut in the same position. Furthermore, the foreign body was imbedded in the ciliary body for twelve days, and had already caused enough irritation to start a cyclitis.

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[1] Since writing this sentence the patient has been again examined (March 11, 1897). Vision is still 6/12, and the chief ophthalmoscopic change is the beginning formation of shining, whitish bands, which pass from the area of former hemorrhage beneath the disk to the region of the original wound. The case in this respect beautifully illustrates the development of these connective-tissue bands as the result of the metamorphosis of intraocular hemorrhage.

[2] This vision still obtains two months after the operation. Later, loss of vision, however, may occur from hyalitis, as in a somewhat similar case which I have reported (American Journal of Ophthalmology, February, 1896). The primary vision after the reaction of the operation had subsided was 6/9, and the vitreous was clear. One month later punctate hyalitis appeared and vision sank to 6/15. The patient was not again seen.

REVIEWS.

As this volume is perhaps the first attempt to apply the collaboration-method to the production of a text-book on physiology, opinions will differ as to the wisdom of the plan, as the editor has anticipated in his preface. While declining to enter into a discussion of the relative merits and demerits of the method, he points out some of its manifest advantages. "The literature of experimental physiology is so great," he says, "that it would seem almost impossible for any one teacher to keep thoroughly informed on all topics." One advantage, therefore, is that "each author has been enabled to base his elementary account upon a more comprehensive knowledge of the part of the subject assigned to him." This advantage will scarcely be gainsaid; but we are inclined to attach less value to the second advantage pointed out by Prof. Howell, which he deems the most important one, the gain to the student of having presented to him the point of view of a number of teachers. Surely the benefit to be thus obtained is only in very small measure comparable to that derived from personal contact with the same number of teachers. It might be so, in larger measure, if the same subject were discussed by a number of writers; but where, as in this text-book, each author presents a different topic, and the presentation of different points of view occurs only where there is an occasional "overlapping," it must be slight indeed. Such overlapping, moreover, has been reduced to a minimum in this book, doubtless by careful editorial supervision, and numerous references in brackets in each chapter to other parts of the book give evidence of this. This same supervision must have had something to do with the excellent balance which has been secured between the various topics both as to quantity and quality of material.

In a brief and excellent introduction Prof. Howell discusses the nature and scope of physiology, its relation to other sciences, and the reasons why it is not so exact in its conclusions as physics and chemistry, for example. The present attitude of physiologists in regard to the existence of a "vital force" is very fairly stated. Such a doctrine, he says, "stifles inquiry." The physiologist, in a word, must deal only with forces which he can demonstrate and measure. The proper attitude, however, in regard to this question is, we should say, one of agnos-

ticism rather than of skepticism. The physiologist can no more deny than he can affirm the existence of such a force. While so many of the phenomena manifested by living organisms continue inexplicable by known physical and chemical forces, the existence of a force or forces unknown to us at present (and that is all the term " vital force " can be held to mean) must be conceded as among the possibilities.

Recent text-books on physiology have presented almost every possible order in the arrangement of topics. The one here followed is, in the main, that of Foster, and seems to us the most rational and advantageous. The General Physiology of Muscle and Nerve is first discussed by Prof. Lombard, of the University of Michigan, under the headings Irritability, Conductivity, Contractility, the Electrical Phenomena of Muscle and Nerve, and the Chemistry of Muscle and Nerve. The discussion of the electrical phenomena, usually a somewhat difficult subject for the student, is, on the whole, very clear and intelligible. The terms " physiological anode and kathode " seem not so good, however, as the expression " regions of polar and peripolar stimulation " used by Waller.

The succeeding chapters on Secretion, the Chemistry of Digestion and Secretion, the Movements of the Alimentary Canal, Bladder, and Ureter, and on the Blood and Lymph, are by Prof. Howell. Recent investigations have added largely to our knowledge of the processes of secretion, which is now one of the most satisfactory chapters in physiology. These new facts have been all incorporated. Of especial interest is the section on Internal Secretions, the existence and importance of which may be regarded as firmly established. Our knowledge of them is as yet very meagre, and a large and promising field is open for investigation. Rather singularly, no mention is made of Nussbaum's experiments on the kidneys of amphibia, the results of which, though not conclusive, have been very suggestive and helpful.

The statement made here, as in most of the recent text-books on physiology, that the acidity of the urine is due to the acid salts, and, by implication, to these substances alone, is deserving of modification in a work of this character. It has been repeatedly demonstrated that the free uric and hippuric acids, the aromatic acids, and especially the free CO_2, though each is present in small amount, contribute, altogether, very appreciably to the total acidity. A simple classification of the white corpuscles has been adopted into lymphocytes, mononuclear leucocytes, and polynucleated leucocytes. A brief reference to the normal numerical proportion of these forms, and an allusion to the fact that variation in the proportion is coming to be of clinical significance, would have seemed not out of place.

In Chapter VII. the Circulation of the Blood is exhaustively discussed under Part I., the Mechanics of the Circulation of the Blood and the Movement of the Lymph, by Prof. Curtis, of Columbia University, and Part II., the Innervation of the Heart and Bloodvessels, and the Nutrition of the Heart, by Dr. W. T. Porter, of the Harvard Medical School.

This chapter is one of the most complete and satisfactory in the book, and presents little for criticism.

The chapters on Respiration and Animal Heat are from the pen of Prof. Reichert, of the University of Pennsylvania, whose own experiments have contributed in no small degree to our knowledge of these subjects. Our attention is arrested by the statement, made on page

547, that "where the proportion of CO_2 exceeds 0.07 volume per cent. the air becomes disagreeable, close, and stuffy—offensive characters which are due neither to the increase of CO_2 nor to a deficiency of O, but to the presence of organic matter termed 'crowd-poison.'" Such a dogmatic statement demands qualification, in view of the diametrically opposite conclusions deduced by Drs. Billings, Mitchell, and Bergey from the experiments of Dr. Bergey as recorded in their recent Smithsonian contribution. These observations, corresponding to those of Dastre and Loye, Russo-Giliberti and Alessi, Rauer, and others, "make it improbable that there is any kind of volatile poisonous matter in the air expired by healthy men and animals other than carbonic acid."

The chapters on the Central Nervous System, by Prof. Donaldson, of the University of Chicago, are of special interest, in view of the large additions to our knowledge in the past few years, which have quite revolutionized our conceptions of the architecture and mechanism of the nervous apparatus. Prof. Donaldson has presented us with an admirable *résumé* of this newer knowledge.

It is very much to be regretted that he has chosen to follow Schäfer in using the term *neuron* in its restricted application to the axis-cylinder process, instead of in its broader application to the nerve-cell with its processes. The most important and fundamental contribution to our newer knowledge of the nervous system is the demonstration that the nerve-fibre is but an outgrowth of the nerve-cell—a constituent part thereof—and the resulting conception of the cell, with all its processes, as an integral unit. It was most desirable that a new term should be introduced to express this conception, and the word *neuron*, proposed by Waldeyer, and since widely adopted into neurological literature, seems the best possible word for this purpose. Its use in the narrower sense by Schäfer and a few others has resulted in a sad confusion of our neurological nomenclature. Moreover, the term *axon* or *neuraxon*, proposed by Kölliker, answers even better as a designation for the axis-cylinder process, if, indeed, a new name were needed at all.

The statements that pain is the result of excessive stimulation of the sensory nerves, which, under moderate stimuli, give rise to other sensations, and that "it appears improbable that special pain-nerves exist," express the generally accepted opinion in regard to pain. The statement that "the nerves which mediate the special sensations of light, sound, taste, and smell do not give pain, even on excessive stimulation" (which statement is repeated by Prof. Sewall on page 843), seems to us open to question, at least in regard to the sense of hearing. The peculiar stinging sensation aroused in the ear by tuning-forks of high pitch, whose rapid vibrations can no longer be appreciated as sound, must surely be classed as a painful sensation, and is evidently due to excessive stimulation of the auditory nerve.

In the chapter on the Special Senses, vision is discussed by Prof. Bowditch, of the Harvard Medical School; hearing, cutaneous and muscular sensibility, equilibrium, smell, and taste by Prof. Sewall, of the University of Denver.

Chapter XII. is devoted to a discussion of the physiology of special muscular mechanism, the action of locomotor mechanisms being presented by Prof. Lombard; voice and speech by Prof. Sewall.

Chapter XIII., on Reproduction, by Dr. Lee, of the Columbia Uni-

versity, is one of the most readable and satisfactory in the book.   Dr. Lee has succeeded in setting forth concisely and clearly the various views in regard to the problems of heredity, the much-discussed theories of Weismann receiving due consideration.

An excellent chapter on the Chemistry of the Animal Body, by Prof. Lusk, of the Yale Medical College, brings the volume to a close.

The book is beautifully printed in large, clear type, and the proof-reading has been carefully done.   We note only a few typographical errors, as follows: "tot" for "to the," on page 131; "Boehm's" for "Boehme's," on page 148; "(page 000)" probably for (page 271), on page 206; "Heidenhein" for "Heidenhain," on page 365; "theorp" for "theory," on page 942; "figure 81," on page 308, seventeenth line, should read "figure 85," and the reference to "(Fig. 34)" should manifestly be to "(Fig. 35);" in the table on page 301 the number "0" in the first column, opposite the word "heart," is evidently an error; the numbers 200, 100, and 50 are not properly placed in Fig. 39 B, on page 107.

The 316 illustrations are well executed, consisting largely of reproductions of kymographic tracings.   They might, with advantage, have been much more numerous.

The collaborators have manifestly differed as to the propriety of introducing bibliographical references; they are numerous in some chapters, as in Part II. of Chapter VII.; sparingly introduced in others.   They add much to the value of the book for the advanced student, and will doubtless, as the editor hopes, have a healthful pedagogic influence.

To the practitioner of medicine and to the advanced student this volume constitutes, we believe, the best exposition of the present status of the science of physiology in the English language.   That it will prove the most satisfactory and useful text-book for the average medical student, for whom it is doubtless mainly intended, seems less certain. It seems to us not sufficiently dogmatic in its statements.   It reflects so accurately the uncertain attitude of physiology in regard to many important matters that it is likely to leave the mind of the student in a state of uncertainty and confusion.   We cannot but regret the almost entire absence of allusion to the practical clinical bearing of many of the facts of physiology, which would have added greatly to its value as a practical text-book.

The reader of this book must be impressed with the fact that much which formerly passed for established knowledge in physiology has been discarded as resting on an insufficient foundation.   On the other hand, it is gratifying to note the great improvement in the methods of physiological experimentation, and the greatly increased care and accuracy with which these experiments are conducted.   Surely no candid observer of these methods can fail to realize that progress in this science is almost wholly dependent upon animal experimentation, and that the knowledge derived by these means rests at the very foundation of scientific medicine.   To prevent or hamper such investigation in any way, therefore, is to arrest the progress of all the medical sciences.

                                                      J. M. D.

ANLEITUNG ZUM OPERIEREN AN DER LEICHE UND AM LEBENDEN MIT RÜCKSICHT AUF DIE AERZTLICHE PRAXIS. FÜR AERZTE UND STUDIERENDE. Von PROF. RIEDEL, Direktor der chirurgischen Klinik in Jena. Jena: Verlag von Gustav Fischer, 1896.

GUIDE TO OPERATIONS ON THE CADAVER AND LIVING SUBJECT. By PROFESSOR RIEDEL, Director of the Surgical Clinic in Jena. Pp. 120, with three lithographic plates and two woodcuts.

THIS brochure is a collection of lectures intended for physicians and students who are studying practical operative surgery. It does not pretend to be a complete text-book. Its object is to teach with particular care the commoner operations which are liable to fall to the lot of young physicians and those whose practice does not bring to them the complicated and unusual operations. These naturally fall into the hands of surgical specialists. The author, however, has not neglected to describe amputations, excisions of joints, and ligations of arteries. Each lecture begins with a short description of the anatomy of the region, or with observations on the pathological conditions requiring operation. He also indicates the difference which the operator will notice between performing any given procedure upon the dead and living subject. Attention to the after-treatment is not omitted, and it is evident that it is the author's desire to make the medical man who is unexpectedly called upon to do an operation feel that he has a judicious guide to follow. The illustrations are of little value. Two of the plates show the vascular relations in the chest, abdomen, and neck. The other is an illustration of an interesting case of bone surgery. The book ends with a discussion of infected and antiseptic wounds and the various forms of suturing.

The author has succeeded in giving a satisfactory epitome of operative surgery. It does not undertake to go over as much ground as the *Minor and Operative Surgery* of Wharton, but it is not intended to be used for instruction in bandaging and fracture dressings as is the latter handbook. J. B. R.

AN AMERICAN TEXT-BOOK OF APPLIED THERAPEUTICS FOR THE USE OF PRACTITIONERS AND STUDENTS. Edited by J. C. WILSON, M.D., Professor of the Practice of Medicine and of Clinical Medicine in the Jefferson Medical College; Attending Physician to the Hospital of the Jefferson Medical College, etc.; assisted by AUGUSTUS A. ESHNER, M.D., Professor of Clinical Medicine in the Philadelphia Polyclinic; Attending Physician to the Philadelphia Hospital. Pp. 1326. Philadelphia: W. B. Saunders, 1896.

THIS bulky volume contains seventy-eight chapters written by forty-two authors, three of whom are not residents of the United States. In a text-book so variously apportioned we must expect all varieties of treatment of the subjects. Some of the chapters are commendable, notably those upon Food-infection, Tuberculosis, Leprosy, Syphilis, Malarial Fever, Internal Animal Parasites, Rheumatism, Gout, Diseases of the Nerves and Spinal Cord, Blood and Ductless Glands, Pleuræ, Kid-

neys, Heart, Stomach, and Liver. Others are thoroughly unsatisfactory, as that upon Dysentery. Some authors treat their subject in a perfunctory manner, and produce merely therapeutic small-talk. Naturally there are at times an overlapping of subjects and consequent confusion. Generally there is fairness in presentation; rarely there is to be found special pleading, as, for instance, for hydrotherapy in the treatment of enteric fever. As examples of careless writing we may cite "scurvy is due to the want of fresh vegetables in the dietary" (page 583). This statement leads to inquiry as to what fresh vegetables should be included in the dietary of infants during the nursing-age. Again, when we are told to "cross-examine the heart" in croupous pneumonia (page 320), the author leaves us entirely in doubt as to what indications for treatment are to be found by this examination. In the main, the prescriptions are in the terms of the last edition of the Pharmacopœia. As exceptions may be noted "acidi arseniosi" (pages 438 and 493) and "strychniæ sulphatis" (page 493). Occasionally we find remarks upon diagnosis presented, and these are entirely unnecessary. We recognize the labor which has been expended by the authors, many of whom are entitled to a respectful hearing; but we are of the opinion that the student of medicine should keep closely to his standard text-book upon therapeutics. The practitioner will find much that will benefit him; but if he is a diligent reader of current medical literature, he will also encounter a great deal that is wearisome in the perusal. R. W.W.

A Treatise on Obstetrics for Students and Practitioners. By Edward P. Davis, A.M., M.D., Professor of Obstetrics and Diseases of Infancy in the Philadelphia Polyclinic; Clinical Professor of Obstetrics in the Jefferson Medical College of Philadelphia; Medical Director of the Jefferson Maternity; Clinical Professor of Pædiatrics in the Woman's Medical College of Pennsylvania; Visiting Obstetrician to the Philadelphia Hospital; Physician to Children's Department, Howard Hospital, etc. Illustrated with 217 engravings and 30 plates in colors and monochrome. Pp. xi., 553. Philadelphia and New York: Lea Brothers & Co., 1896.

This volume is one of experience in a double sense: first, in obstetric art, which places the book on a level with like works by able authors, but, more important, in that experience which has taught the author what student and practitioner need in an elaborate treatise on obstetrics. From its arrangement the conviction is forced upon the reader that the author's experience as a teacher induced him to eliminate elementary matter and in his first chapter to enter into the very heart of his subject by obstetric diagnosis. This promising beginning is never deviated from, and a scientific grouping of the subject is followed throughout. It is a satisfaction to hope that hereafter the classical opening of the usual chapters on anatomy and physiology of woman's pelvic organs will be waived under the graceful assumption that the reader knew a little about that before. That classical opening was not obstetrics in any sense, and the author deserves well of his readers for making his book conform to the strict limitations of its subject as a science and art.

Chapter II. is given up to Differential Diagnosis of Pregnancy. Chapter III. considers the Diagnosis of Advanced Pregnancy and the Complete Examination of the Pregnant Patient. In Chapter IV. we have the Origin and Growth of the Ovum and the Development of the Germ, and in Chapter V. the Growth and Development of the Embryo. In his sequence of topics the author may be said to have written the first text-book that is the outcome of the modern method of advancing the student from group to group of subjects scientifically and logically arranged. The special feature in the chapter on the Diagnosis of Advanced Pregnancy is the importance given by the author to the determination of the placental site. This is so generally overlooked by writers that it is worthy the special attention of the reader. In these times, where delivery by abdominal incision is becoming more frequent, the practical importance of being able, with some show of certainty, to locate the placenta, will prove an important part of its technique.

As might be expected from the active interest that the author has taken in the Röntgen rays very early in the discovery, he has utilized this method in obstetrical diagnosis. In his method the plate is applied to the patient's body, and in the usual position of the fœtus, to the left side, while the vacuum-tube is placed upon or near the opposite side of the abdomen. In the author's experience an exposure of an hour has been necessary to give an outline of the body of the fœtus within the womb of the mother. The evidence given by the picture of the position and presentation of the child was later verified at labor. If the head of the fœtus has entered the pelvis, it is difficult, if not impossible, to define the fœtal bones from the pelvic bones of the mother. The author says that he was unable to observe that the passage of the rays had the slightest effect upon mother or child. The most practical application of the rays appears to be the direct inspection of the shadows through the fluoroscope, as it saves the enormous exposure of over an hour, while giving at once, by direct inspection, the information sought after. The skiagraph of an infant's body in which the viscera can be marked out is given in a very excellent plate, and there is also a plate of a pelvis and fœtal skull. The author's estimate of the value of this method of examination is that it "has been employed for too short a time to permit a definite statement as to its results; but what has been done is so remarkable that it is evident that great advantages must accompany its use. While the pregnant patient is one of the most difficult subjects for such a study, still there is no insuperable difficulty in obstetric diagnosis by this method."

Two compact and finely illustrated chapters on the Growth of the Ovum and Germ and the Growth and Development of the Embryo follow and close the introductory part of the volume. It may be of interest to state that the author leans to the chemical side of heredity-transmission as formulated by Oscar Hertwig (*Die Zelle und die Gewebe*, Jena, 1892). This, the latest, ignores the nucleus, and the chromatin is assigned the medium of transmission, and "since spermatozoa in some cases consist almost exclusively of chromatin, it is probable that chromatin is the essential factor in the function of heredity. The child is like the parents because its organization is regulated by not merely similar, but by some of the same chromatin as that of the parents." Simplicity in theory can go no further, and, as the subject is entirely within the borderland of the unknowable, this feature of the theory

ought to place it alongside of other hypothetical facts. Chapter VII.
treats of Pathology of Pregnancy. Theoretically the author may be
correct when he states that "inflammatory disease of the tubes, ovaries,
or pelvic peritoneum is a distinct contraindication of pregnancy, and
patients suffering in this way should have the pelvic disorder cured
before conception can possibly occur." Unfortunately it is in some of
these conditions that very disastrous forms of pregnancy occur, and nor-
mal uterine pregnancy is not rare in very severe forms of pelvic inflam-
matory conditions. In fact, the reviewer's experience has been such
that he no longer uses the word impossible in the matter of pregnancy.

The great frequency of serum-albumin during pregnancy (5 per cent.
in early to 71 per cent. in late or advanced gestation, with but 2 per cent.
of the latter with casts present) is a timely statement and one that will
allay the nervousness of the young practitioner. In concealed intra-
uterine hemorrhage in which surgical intervention is necessary, the
author's operation of choice is Porro's, on account of its rapidity of
performance. In rapid delivery by speedy dilatation, version, or forceps
the prognosis is good. In eighteen cases of delivery by forceps but four
deaths are reported, while in sixty-three treated by rupturing the mem-
branes and ergot forty died. In this connection the author says that
this furnishes "a further reason for the prompt induction of labor in
all cases in which nephritis is diagnosticated," on account of its possible
association with hemorrhage. A statement like that quoted is of great
value in helping a consultant in such cases, as there is great reluctance
on the part of practitioners to consent to the induction of labor on
account of nephritis. It is difficult to explain this, as the average physi-
cian is not overburdened with respect for fœtal life. The author brings
out the fact very clearly that there are other factors at work in the
toxæmia of pregnancy than the one, that has held sway so long, of
uræmia, and that it may be bacterial, although no one agent of that
nature has been isolated. In twenty-two fatal cases of toxæmia no rela-
tion could be shown between the severity of intoxication and the condi-
tion of the kidneys. It is to be deplored that the difficulties in the
way of clearing up this vastly important matter of pathology have
proved insuperable. The treatment, with an elaborate diet-list, of this
condition, is given, followed by working formulæ for urinalysis, with
tables of approximate proportions of urea for clinical use. The distinc-
tion between albuminuria and toxæmia of pregnancy is sharply drawn
and insisted on by the author. Serum-albumin with hyaline casts,
attended by swelling of the feet, is not infrequently seen, especially in
multigravidæ, and not dangerous. This chapter is one of the most care-
fully written and original in the book, and shows the earnest, pains-
taking care that has served to place our author among the first in his
special study. Chorea is given the most elaborate study in any work
on obstetrics with which we are familiar, and much is stated that throws
light upon this rare complication. The chapter on the Pathology of
Pregnancy is one of the most carefully written in the book, and a vast
mass of facts and conditions and the better way of meeting them in
practice are brought together in a most teachable form.

Normal labor and its management is written on well-approved lines,
and is characterized by the clearness in statement that pervades the
book generally. Upon one point, however, the practical physician may
differ from the author. "As soon as the labor is over, and the womb

well contracted, it is proper to give a copious vaginal douche of bi-chloride solution—1 : 4000." As the auto-antiseptic properties of the healthy vagina have become known the use of the douche directly after labor may be considered a doubtful measure, especially as the mercury in the presence of blood and serum covering the vaginal walls would form the harmless albuminate, which it is doubtful if a douche would wash away. Whether to use the douche at all after normal labor is a question that has not yet been answered. The reviewer has noticed that in cases where considerable odor has developed in the first lying-in week a careful cleansing and disinfection of the vulva and labia, under inspection by the nurse, would generally remove it; and that it is when the uterine and vaginal discharges become oxidized by contact with the air that fetor is developed. In case of a considerable tear of the peri-neum which has been neglected or improperly repaired the air has free access to the entire vaginal tract, and the whole surface may require disinfection. The douche does this very imperfectly, and a gauze sponge in the grasp of the dressing-forceps, after careful scrubbing of the ex-ternal genitals, will open the folds of the vagina to the action of an antiseptic. We suspect, however, that the author is writing from the standpoint of the maternity hospital, where disinfection is demanded; while the comment made by the reviewer is from the point of view of the private obstetrician.

The author, wisely we think, makes his classification of position very simple and based upon practical methods. Thus, he makes but two posi-tions for each presentation. The mechanism for each of these two posi-tions is all that is necessary for any other possible presentation of the position.

The subject of Abnormal Labor follows Impossible Labor. The illustrations in these chapters are especially good and clearly explain the text. The process-cuts from actual photographs are excellent in clearness and definition, especially those in normal breech labor.

The second section is devoted to the Pathology of Labor. The first chapter is on the Induction of Labor, and is on purely conventional lines. Abnormal labor-pains and rigidity of the birth-canal give the author an opportunity to display his concise methods to the best advan-tage, and introduce a large amount of practical information in a very small space. As might be expected from the author's large hospital connections, his operative manipulations are very clearly expressed, but, in spite of a certain radicalism that finds its way into the work of the hospital obstetric surgeon, our author is very conservative.

We notice the free use of chloroform advised in view of the fact that there is a widespread dread of chloroform existing in the profession to-day. In what theatrical people in this country call the "Provinces," among middle-aged practitioners this has been repeatedly noticed by the reviewer, and articles in the journals on chloroform in labor are yet in order and will do missionary work. When one well-informed physician in a county medical society boasts that he has used forceps very frequently for twenty years, and has in no instance given an anæs-thetic, one may well believe that the wheels of progress do not move so fast as those of time.

The subjects of ante- and post-partum hemorrhage and placenta prævia follow. The latter subject is finely illustrated with full-page plates in polychrome from Runge and Stratz. In cases requiring decision and

promptness, such as hemorrhage, the author's style is fitted to appear at its best. The chapter on Eclampsia is purely a practical one. No space is devoted to theoretical exposition as to the cause. It is a matter of regret that the author has not given further study and more space to it in the present volume. His reliance appears to be placed upon as early delivery as possible; while veratrum viride, chloroform, large doses of morphine or chloral are given paragraphs, and always with a caution. It is striking evidence of the complicated mental process involved in the minds of a multitude when in search of a fact that the cause, and especially the treatment, of this very serious disease have not yet reached an accepted basis. The reviewer's explanation of this is that two very distinct diseases are confounded under the name eclampsia; one—the fatal one—is due to blood-toxins, not necessarily attended with albuminuria; and another form, purely of a nervous type, without blood-toxins, that often comes on after labor, that often persists notwithstanding delivery, that, in the absence of a better term, may be called hystero-epileptiform, that shows albuminuria after the beginning of the seizures and not before, and that quite generally recovers in spite of good or bad treatment. This, in the reviewer's opinion, is the explanation of the vast literature of the subject, with each contributor exploiting different and contradictory treatment and all effecting a cure.

Sudden Death during Labor is the title of the next chapter. This accident is well handled, and the various causes involved meet with the heroic measures that sometimes may be necessary to save life. In rupture of the uterus, in sudden intra-abdominal hemorrhage, laparotomy, as might be expected in a book written to the front of progress, plays an important part and is promptly advised. If it were possible to get correct statistics upon any subject touching upon abdominal and pelvic surgery, it would be very useful to know what proportion of failures occur; we always hear of the successes.

Chapter VI. of this section is assigned to Labor Complicated by Disproportion between Pelvis and Fœtus. Ether is the anæsthetic of choice in the serious obstetric manipulation described in this chapter, as the author says it stimulates uterine contractions. Walcher's position, which is becoming so well known, is working its way into practice in cases of disproportion. In two cases in which it was practised the reviewer noticed the upper third of the thighs were supported by the edge of the bed. It must be remembered, however, that the pelvis only, the author states, must rest upon the edge of the bed if movement is to be secured at the sacro-iliac joints. Another practical point is that the so-called cottage bedsteads, so often found in the houses of the poor, are too low to allow the necessary depression. Chapters on the Justo-major and Justo-minor Pelvis follow. Some very good illustrations are given of Johnson's method of pelvic measurement by the introduction of the hand within the vagina in the examination of the justo-minor pelvis; but it is a manipulation rarely to be accomplished without an anæsthetic; when we take into consideration the difference in the size of the hands, it makes the standard of measurement too uncertain to be of general utility. The old method of using the index-finger in measuring from the sacral promontory to the pubic joint will be a better guide to the young obstetrician. Chapter IX. on Labor in Rare Varieties of Deformed Pelvis is finely illustrated, and the whole field is thoroughly covered in six pages; the reviewer has never known the

subject more exhaustively and minutely treated. This is due to the fact that the author is writing upon obstetrics, and not upon anatomy, or physiology, or etiology. Chapter X. is brief, on Labor in Cases Complicated by Tumors of the Pelvis and Genital Organs. In abdominal delivery induced by uterine fibroids the operator is advised that the uterine incision will not heal, and hysterectomy, and not cœlio-hysterotomy, is the choice. Avoid puncture in cases of œdema of the labia by hastening delivery by the forceps. Avoid rupture in cases of labial hæmaturia by the same prompt measures.

Septic Infection concludes this section of the work and well defines the symptoms and treatment of this condition. The author places great value upon stimulants and strychnine in the medication of these cases. In marked and profound septicæmia the reader is justified in resorting to intravenous transfusion of normal saline solution. Several cases are now recorded with excellent results. These cases were published too recently to appear in the text of the author. Another point very recently brought out is in the use of stimulants, especially in the case of mixed infection and when streptococci are present. The stimulant is given just as a frontiersman uses it in snake-bite. There is no limit to the quantity, simply all the patient can take. Strange to say, intoxication, as it is usually observed, does not occur. The excretion of urine is enormously increased, often approaching 100 ounces in twenty-four hours; the inflammatory effect of the poison upon the heart is diminished, if not prevented. It is well to try it, especially when the observer has reasons to believe that the septic condition is generalized and surgical intervention hopeless. Surgery in these extreme cases affords so little hope of betterment that in the interests of surgery operations ought not to be undertaken.

Section III. is taken up by Obstetrical Operations. Chapter I. explains the Method of Assisting Delivery by Episiotomy, Multiple Incisions of the Cervix, and Sutures of Tears of the Perineum and Pelvic Floor. For the first of these operations suffice it to quote that "the disadvantages do not outweigh the gain which this simple procedure brings about." Our author advises the immediate repair of extensive lacerations of the cervix, and the small ones usually repair themselves by granulation; while the conditions under which the cervix may be incised and threatened laceration prevented are well defined. Speaking of the suture of the pelvic floor, our author characterizes it as a simple procedure. We can hardly see our way to agree with that, and if he will take our view of it he will have an explanation of why it is " often done in a careless and inefficient manner." The operators have simply done their best work. There is, in our opinion, no operation upon the female genitalia that requires greater surgical tact or a clearer knowledge of what is to be gained by the procedure, and there is no operation that affords a better test of the inefficiency or thoroughness of a nurse. This subject is well illustrated by photographic reproductions and diagrams on wood.

The important topic of the forceps is next treated in the most elaborate chapter in the book. The indications for the employment of the instrument are carefully given and its application described briefly, but in language admirably clear. In high operations he refers to the old procedure—still in use at the hands of some, appearing now and then in the obstetrical articles in the journals—"that the forceps should be used as a lever to pry the head from its oblique position, or

used by a pendulum movement with traction," or to rotate the head forcibly by turning the forceps. These methods have been entirely abandoned by the writers of text-books since axis-traction forceps have come into more general use. Figures 163 to 166 inclusive are very excellent specimens of photograph reproduction, but the remaining figures by this method are not so good. The time probably will come when illustrations in operative procedures by this method will be uniformly good, but it is not yet. On the whole, we do not think any but the carping critic will find fault with the author's work in the difficult task of describing the use of the forceps.

Chapter III. comprises Version and Extraction. The chapter is short, with one illustration, but could not be made better by greater length. Chapter IV. is devoted to Symphysiotomy, and is assigned the space equal to the importance of the subject. The anatomy of the parts involved in the operation is given, and the conditions under which the operation is called for conclude with the following brief summary : " The positive indications for symphysiotomy are : where but moderate disproportion between the size of the child and the mother is present, where mother and child are in good condition, where the soft parts of the birth-canal are dilatable, and where proper care during and after the operation can be obtained." It will be seen that the field is considerably narrowed by so strong an advocate of the operation. The after-care of the patient is most carefully detailed and illustrated by figures descriptive of the method of applying the dressings. The author states the mortality from this operation in America is *nil*, and, if any, is "due to attendant circumstances and not to the operation itself." Chapter V. is on Cœlio-hysterotomy, better known under the classic name of the Cæsarean section. The operation described is a modified Sänger, without reflecting the uterine peritoneum from the edges of the uterine incision, using silk sutures in the muscular stroma and catgut or silk in the superficial row. The author's faith in modernized cœlio-hysterotomy is stated in very positive language : "The results as performed in the best hospitals give so good a chance, and so nearly an equal chance for recovery, that the question of prognosis need not enter into the decision." This, we suppose, he means in cases of election. The unfortunate gynecological surgeon who is called in after labor of two or three days tells a different story. Cœlio-hysterectomy, including Porro's operation, is described in the next chapter (VI.). The author expects good results to follow after the former, and, if the patient is in a condition to stand a prolonged procedure, it is to be selected in preference to Porro's operation, which has only speed of performance in its favor. Chapter VII. describes Embryotomy, in which our author takes the advanced surgical view of the situation, when he is allowed a choice, and limits this operation to the dead fœtus. A short chapter on Obstetric Curettement, Operative Emptying of the Uterus, concludes this section.

Section IV. is devoted to Abortion, Extrauterine Pregnancy, and the Puerperal State. Chapter I., Abortion and Premature Labor, concludes with some very practical hints upon obstetrical operations in private houses. Extrauterine Pregnancy follows in Chapter II., and is richly illustrated. Its treatment is purely surgical, and our electrical friends are spoken of as "unworthy of confidence." The reviewer has a considerable number of facts collected from pelvic operations which tend

to show that ectopic pregnancy is very common, and the death of the ovum early in its development the rule. The continued growth and consequent rupture of the tube are a rare accident compared to the frequency of the ectopic state. This is the way that we explain the frequent cases in which the death of the ovum occurs after the use of electricity where the diagnosis was hardly a matter of doubt. It appears to the reviewer that there can be but little doubt that spontaneous cure is the rule in ectopic gestation. In Chapter III. the Puerperal State and its Complications are given. It is one of the most carefully written and elaborate chapters in the book. The illustrations comprise eleven full-page plates in addition to numerous figures in the text. Among the complications it is interesting to note the author's position concerning the various operations to correct posterior displacement of the womb made prior to pregnancy. His operation of election is shortening of the round ligaments. Ventro-fixation is not condemned, and but one complication, that of restricting the development of the anterior wall, is pointed out. Vaginal fixation is condemned, and the complications due to it illustrated by a very realistic figure.

The author advises the use of the blunt curette in septic infection of the uterus. The reviewer has serious reason to believe that the sharp curette in these cases is an instrument of death; and for internal treatment we know of no writer that accents the *ad libitum* use of stimulants equal to our author, and in which the present writer has a most personal reason to put absolute faith. In the surgical treatment of sepsis the author's first suggestion is by drainage through the vaginal route and openings made through the abdominal wall only in the most desperate cases and beyond aid through the vagina. This is in accord with the most recent practice. "No greater error," our author observes, "can be made than to give puerperal septic cases antipyretics." High temperature may be relieved by cold sponging or the cold coil. In this way the heart is sustained and the conditions not obscured. Two chapters follow, one upon the Secondary Repair of the Cervix, and the other upon the Repair of Injuries to the Pelvic Floor and Perineum, with Cystocele and Anterior Colporrhaphy. A chapter on Lactation completes the section.

Section V. is occupied by the subject of Infancy in Health and Disease, which is divided up into chapters on Normal Infancy, the Pathology of the Fœtus, Injury at Birth, Asphyxia, Disease of Early Infancy, Incubation and Artificial Feeding, and Abnormalities of the Fœtus. Illustrations are freely used in this section, and the text conveys a large mass of material in a relatively small space. Section VI. treats of the Diseases of Infancy, divided into five short chapters, and well rounds out and concludes the obstetrical part of the volume.

A very excellent feature of the conclusion of the work is a section upon the Jurisprudence of Obstetrics, and what we may call a guide to conduct and obstetrical good morals. What the author says is to the point and very interesting. Some questions relating to the legal aspects of abortion will probably never be settled, as each obstetrician must decide for himself to what extent he will become a private detective. If we could blot out crime by punishing the offender, it would be a matter of conscience with us all; but as it is now it is rather a matter of expediency among the best of us. When we have to aid a woman, and an unhappy and unfortunate woman, the good man recoils from

what would add a sting to her misery.   In the last chapter of the book,
on the Legal Aspects of Obstetric Practice, it is difficult to understand
the author's remark about gynecologists on page 539.   The reviewer is
perfectly willing to regard obstetrics as the mother of gynecology.   We
have not offered any objection to our author assigning two very excel-
lent chapters of his book to the subject—as difficult as any to be found
in the whole range of gynecological surgery—that of plastic operations.
And while we admit that it would be a state of things greatly to be
desired that the obstetrician should be able to perform them, we do not
believe that he can do so as well as the gynecological surgeon.   Gyne-
atrics is a special field that has come under culture, not from the ignor-
ance of the obstetrician, but from the necessity of long study and con-
stant practice in the art.

Dr. Davis's book is the work of a born teacher.   In the thorough-
ness which he has given to every chapter, in the omission of all un-
essentials, he evinces his knowledge of what the student needs.   The
work is purely an individual one, and from cover to cover there is not
a reference to authority; but the whole is so individualized and the
matter so thoroughly assimilated by the author that the reader feels
throughout the personality of the teacher.   We predict for the volume
a successful future.   It ought to be the text-book for the undergradu-
ate, and we have no doubt that its many merits will be duly appreciated
by him.   Mechanically the book is everything that can be desired,
while the illustrations form an exceptional feature in the way of origi-
nality and excellence.   E. V. DE W.

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UNDER THE CHARGE OF

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Treatment of Bubonic Plague.—Mr. James Cantlie, after noting general hygienic details, advises calomel in from 5- to 10-grain doses, followed by a saline in some five hours' time. This frequently stops vomiting, which is often present, clears away the jaundiced aspect, restores the power of taking nourishment, and seems to diminish mental aberration and cardiac distress. From the very onset, or certainly after twenty-four or forty-eight hours, it will be found necessary to stimulate the patient by food, alcohol, or medicine. Unless the patient is actually delirious, there is not usually much difficulty in feeding. In fact, in comparison with allied ailments the appetite is wonderfully good. On the other hand, a full meal is not without its dangers. Food should be in small quantities, frequently repeated, and of a kind which is easily digested. Essence of beef, in fluid or jelly form, is excellent. Ox-tail soup, mutton-broth, beef- and chicken-tea should be at hand and varied to suit the patient. Conjee water—water in which rice is boiled—is useful as a drink and serves as nourishment. Milk with ice, sipped slowly, and ice-cream are particularly grateful. Thirst is a marked symptom, and ice to suck, if not kept up too long, water or lemon and water (not lemonade) to drink, iced beer and stout, brandy, or whiskey diluted with three or four times its quantity of water (not aërated waters) may all be used. When the pulse shows signs of failing or collapse or faintness supervenes, the alcohol is doubly beneficial, and brandy is preferable to whiskey. The active delirium is best controlled by cold to the head—Leiter's coils, ice-bag, or wet cloth. Of drugs, hyoscine in $\frac{1}{100}$ grain dose hypodermatically is the most efficient and safe of the hypnotics. At times nothing will avail but morphine, in $\frac{1}{8}$ to $\frac{1}{4}$ grain dose subcutaneously in combination with atropine, which is most useful when painful adenitis complicates the cerebral intoxication. Of the symptoms, diarrhœa may be treated by salol in 10-grain doses, or by a suppository of morphine, $\frac{1}{4}$ grain, and cocaine, $\frac{1}{2}$

grain. Vomiting may be controlled by a mustard-plaster to the epigastrium, ice to suck, and an effervescent draught of a few drops of hydrocyanic acid and solution of morphine. For the pyrexia chemical antipyretics should not be used. Frequent sponging with tepid water, ice to the head and nape of the neck, iced drinks, and a short application of the wet-pack, with the administration of brandy by the mouth or rectum, are useful. External stimulants, as fly-blisters and mustard to the limbs, abdomen, and over the heart, are serviceable. Smelling-salts and strong ammonia to the nostrils often arouse a patient in collapse and permanently revive those apparently moribund. Hypodermatic injections of ether must be used frequently and freely, and are likely to be attended by remedial results. Internally, ammonium carbonate in a tincture or decoction of cinchona is most useful, while digitalis and strophanthus are unsatisfactory. Camphor, either hypodermatically in sterilized oil or as a 2-grain pill, is a direct stimulant and a stomachic carminative. Musk may be used in 5-grain doses every six hours. Strychnine sulphate in $\frac{1}{48}$ grain dose hypodermatically is regarded as a more reliable agent, and the inhalation of oxygen is not to be neglected.—*British Medical Journal*, 1897, No. 1883, p. 249.

Enteric Fever Treated with Antitoxic Serum.—Mr. Frank M. Pope reports four cases, the serum (prepared by Bokenham) being injected into the loins under careful antisepsis. In two cases steady defervescence took place from the date of the first injection, although this should not have been expected for six or seven days. This defervescence took a somewhat long time, so that it is possible that the period of the disease was not much shortened, but their general condition during the third week was much less serious than we are accustomed to see. In two instances there was an urticarial rash, which started at the seat of puncture and spread to some distance on the surrounding skin.—*British Medical Journal*, 1897, No. 1883, p. 259.

Treatment of Chlorosis.—M. Barbier states that the most efficacious preparation is iron protoxalate. Of accessory symptoms, the fever should be treated by the wet-pack, the neuralgia by anodynes, especially those which do not destroy red blood-corpuscles, and the dyspepsia, which is often set up by food which is too rich or too irritant. The majority of chlorotics suffer from hyperpepsia and hyperacidity, and the stomach should be cared for before commencing the iron.—*Revue de Thérapeutique*, 1897, No. 4, p. 116.

Digitoxin.—M. L. Adrian, in order to clear up the confusion at present existing, presents the following statements: (1) The digitoxin studied in 1888 by Lafont and Bardet is not identical with the more active commercial article of 1893–'94. (2) This difference leads us to believe that digitalis, besides the digitalin already isolated in purity, contains a very active glucoside of the strophanthin type. (3) This digitoxin is not in every case a pure drug, for its variations have been demonstrated, and for this reason should be omitted from the pharmacopœia for fear of accidents. (4) The digitalin of Nativelle is a pure, crystallized product of constant composition, of constant pharmacological action, and for these reasons should be the only one

admitted to the pharmacopœias. Recently Kiliani has presented a gluco-sidal body of the chemical formula $C_{36}H_{58}O_6$, or exactly that established by Arnaud for crystallized digitalin. This substance, designated as digitoxin, is none other than the crystallized digitalin of Nativelle.—*Les Nouveaux Remèdes*, 1897, No. 3, p. 78.

Serum-therapy in Poisoning by the Venom of Snakes—DR. PAUL GIBIER states that as soon as possible after the bite we should inject 2 to 5 drachms, and even more when the wound has been inflicted upon a person of large size by a dangerous reptile, as the rattlesnake. The injection should be made with the usual antiseptic precautions in the subcutaneous tissue of the lateral part of the abdomen. While the injection is being prepared, and in case the bite has been inflicted on a limb, it is well to surround the latter tightly just above the bite, between the bitten part and the body, with a string, a handkerchief, or any other piece of linen. An excellent means of destroying the venom which has not been carried into the circulation con-sists of injecting into the puncture of the bite and surrounding tissues 2 drachms of a 1 to 60 solution of lime chloride. The same syringe may be used as for injecting the serum. A few minutes after injection the ligature may be removed. The patient is then rubbed vigorously and hot tea or coffee administered in order to determine an abundant perspiration. The action of fermented drinks or ammonia is dangerous. The local application of caus-tics is at least useless.—*Bulletin of the Pasteur Institute*, 1897, No. 1, p. 12.

The Treatment of Heart-disease, with Special Reference to Mitral Regurgitation.—DR. H. A. HARE states that the first and most important point in the vast majority of cases is rest, placing the patient flat on his back in bed, or at least in the reclining position, and, removing all unnecessary exercise, diminish the work of the heart to an extraordinary degree. When medicines are needed there is nothing better for the majority of cases than digitalis, given in doses of from 5 to 20 drops of the tincture night and morn-ing with meals. This should be stopped every few days, or at least decreased in quantity, to allow the system to eliminate or distribute what remains of the earlier doses. If the urine decreases rather than increases in quantity, the cumulative action of digitalis must be looked for with increased diligence. If anæmia coexists, iron and arsenic, particularly the latter, which seems to improve the nutrition of the heart-muscle, are necessary. In patients well advanced in years, with beginning atheromatous change in the bloodvessels, potassium or sodium iodide often proves exceedingly valuable. Residence during the winter months in a mild climate, where the peripheral blood-vessels will not be contracted by cold and therefore will not increase the work of the heart by offering obstruction to the peripheral circulation, will be of much benefit. Venesection will frequently give relief if there be evi-dence of pulmonary congestion and laboring of the heart due to distention of the right ventricle. A hypodermatic injection of morphine will often act with great advantage during a paroxysm of cardiac failure. When the action of the heart is exceedingly irregular and the organ is irritable, an ice-bag applied to the præcordium is sometimes valuable, but care should be taken that it does not give the patient cold. Warm baths designed to dilate the

peripheral bloodvessels and to increase the action of the skin, and the daily use of massage, are valuable adjuncts to the treatment above outlined.—*The Medical Fortnightly*, 1897, No. 6, p. 155.

Treatment of Gout.—Dr. F. Levison, believing that the uric-acid output does not depend upon the intake of albuminoids, but rather that the disease is secondary to renal degeneration, which, in turn, is caused by the failure of the uric acid to remain in solution, and further noting that the nucleins increase the production of uric acid, would exclude from the dietary all substances rich in nuclein, as thymus gland, liver, kidney, and pancreas. According to Kossel's observation, this prohibition should exclude also the yolk of egg, the paranuclein of which comports itself as nuclein. Alcohol, especially in high percentage liquors and in concentrated solutions, not only increases uric acid, but also directly injures the kidneys, and therefore should be forbidden. Coffee seems to increase the amount of uric acid. In order to prevent the precipitation of uric acid in the kidneys, large quantities of fluid should be taken; the best is boiled water or milk, which will wash out the body and dilute the urine. Mineral acids are not allowed, but vegetable acids, especially those which are oxidized to alkaline carbonates, can be used without harm. Excessive alkalinization of the urine leads to two dangers: (1) the formation of a phosphatic calculus, or (2) in patients whose kidneys are already diseased and in whose blood there is already commenced a storing up of uric acid, there supervenes an acute attack of gout from an excessive amount of sodium salts in the blood and tissues. So long as the reaction of the morning urine is only feebly acid and the sediment obtained by centrifuge contains no uric-acid crystals, all is attained that is attainable from the use of alkalies, and further increase of the dose is not only unnecessary, but may be directly harmful. Recognizing the dangers of excessive use of the alkalies, von Norden makes use of calcium carbonate in the treatment of gravel. Calcium carbonate is not eliminated by the kidney, but in the intestines unites with phosphoric acid and is eliminated as calcium phosphate. Thus phosphoric acid being diminished in the urine, the triple phosphates are then more largely formed, while the mono-sodium phosphate is in a smaller amount, so that the urine remains acid and yet holds uric acid in solution. For acute gouty attacks the greatest reliance is placed upon colchicum. For the stiffness and deformities various methods have been in use— dietetic regulations, massage, iodine-painting, and especially various warm baths, as Aix-les-Bains, Aachen, Eilsen, Franzensbad, or Sandefjord.

Recently, Grawitz makes use of hot sand-baths; the dry sand is heated to a temperature of $104°$ to $122°$ F. and the limb wrapped in it. This has not, according to the author, benefited any instance of arthritis, although it relieves nerve-pains, as in neuritis after influenza. Of the various chemical remedies, piperazin, lysidin, lycetal, and others of the kind are without theory as to their action, and their first words of praise are followed by adverse criticism, so that their popularity is of short duration. Of much greater value is the electrical treatment, making use of a battery of forty-eight large Leclanché cells for thirty minutes. The positive pole, connected with a carbon electrode, is immersed in a 2 per cent. solution of lithium chloride which has been made alkaline with lithium carbonate. The negative

carbon electrode is placed in a very weak sodium chloride solution. The portion of the body to be treated is placed in the lithium bath and a convenient part, as the hand or foot, is put into the salt solution. A current of twenty to thirty milliampères is now passed, although some patients cannot bear more than ten. Of the fifteen patients who received this treatment, ten were markedly benefited, while in the remainder the results were less favorable or negative. The results claimed are that stiff and useless joints become movable and serviceable; that the pains are completely removed, and the muscular atrophy disappears. The theory of the action is that lithium, at the positive pole, is separated from the lithium chloride solution and carried into the body in an available form, so that readily soluble lithium urate is formed from the deposited urates.—*St. Petersburger medicinische Wochenschrift*, 1897, Nos. 1, S. 1; 2, S. 9.

The Abortive Treatment of Acute Coryza.—M. Courtade makes use of a siphon-douche to irrigate the nasal passages with saline solution at a temperature of 122° F., a pint of the liquid being usually sufficient. The jet must not be directed against the lateral wall of the fossa, for this will provoke a sensation of heat. A fall of three to four inches is sufficient for nasal purposes. In order that the irrigation may be suddenly stopped, if necessary, the tube should be furnished with a cut-off. The higher the temperature the smaller the quantity of fluid which will be necessary. Since it is the heat which is important, the choice between solutions of sodium chloride and sodium bicarbonate is indifferent. Antiseptic solutions having a bactericidal action may be used. This method should be used with care, in order that an otitis media may not be set up.—*Bulletin Général de Thérapeutique*, 1897, 3e liv. p. 90.

Treatment of Asthma.—Dr. W. Brügelmann, after reviewing the causes which may give rise to the symptom asthma, recommends the removal of local irritations. To lessen the sensibility of the respiratory mucous membrane, sprays of 1 per cent. tannic solution or of potassium chlorate in atomizer may be useful. In bronchial asthma inhalations of ammonium chloride solution or strong carbolic mixture from a Wulff-bottle are recommended. In asthma of cardiac origin the inhalation of compressed air, with the use of digitalis and strophanthus, is indicated. If interstitial nephritis is a causative factor, milk-diet, baths, diuresis, and diaphoresis are in order. The *éducation asthmatique* means the use of suggestion and autosuggestion, tending toward better mental processes, until the stereotyped answer of the asthmatic, "I cannot," is no longer met with. To suggestion may be placed the cures following the use of secret remedies or the directions of irregular practitioners. The diet should be the usual mixed one. In seeking for a climate it is well to remember that for a time immunity from attacks may be apparent, but finally acclimatization takes place and the symptoms reappear.—*Therapeutische Monatshefte*, 1897, Heft 2, S. 74.

Pain and its Therapeusis—Dr. S. V. Clevenger, after pointing out the disadvantages of various analgesic drugs, states that lactophenin is destined to supersede largely the entire array of analgesics proper, owing to its non-

toxic peculiarities and the feeling of comfort described by many physicians as following its use. It affords the best results with the least ill effects. Its range of incompatibility is less than other synthetic compounds, and it may be combined with caffeine, quinine, and salicylic acid. The minimum dose of 5 to 10 grains may be increased until a daily maximum of 45 grains has been reached. It is but slightly soluble in water, although acting promptly, so that it can be given dry and be washed down with a drink of water. A dose of 15 grains usually acts as a feeble hypnotic. There are no untoward symptoms following its use, and, contrary to the experience with some synthetic drugs, the pulse becomes fuller and stronger under its use. The range of application is extensive, and the testimony of the author is in corroboration of the findings of other physicians as to its superior analgesic effects, its safety and promptness of action.—*Journal of the American Medical Association*, 1897, No. 5, p. 173.

The Treatment of Dysentery.—MR. JOHN MABERLY, from his experience in over one hundred consecutive cases, believes that in the *Monsonia ovata* he has a more powerful remedy than any which we at present possess in the treatment of the various forms of dysentery. A tincture of the plant is made by maceration in spirit (1 to 8). The dose varies from 1 to 4 drachms at four-hour intervals. The average number of days under treatment was 8.1 for chronic and 2.3 for acute cases. It was found by experiment that some specimens of the plant were more active than others, due apparently to the facts that they were too old when collected, and that other drugs were at times made use of. Apparently there were no fatal cases.—*The Lancet*, 1897, No. 3832, p. 368.

Condurango.—DR. G. BARDET believes that there is no doubt this is a drug, calming in its action, which diminishes the reflexes and antagonizes exaggerated motility. This is especially noticeable in gastric pain, and, in addition, it improves the digestion of persons suffering from lesions of the stomach. According to Tcheisow, it stimulates the pancreatic and biliary functions, and this supplements its action upon gastric digestion. It does not, however, produce a specific effect in gastric cancer, but only acts as above noted. The dose of the 20 per cent. tincture is from two to four teaspoonfuls and of the extract seven to fifteen grains. In prescribing this drug it is well to specify the bark of the white condurango, which is the only species as yet studied.—*Les Nouveaux Remèdes*, 1897, No. 3, p. 65.

Action of the Roentgen Rays upon the Normal Skin and Hair-follicles.
—DR. A. FORSTER has reached the following conclusions: (1) one to two hours' use of the ordinary tube does not give rise to any dermatitis; (2) the same statement can be made as to short exposure with the best focus-tubes; (3) a single half-hour exposure gives no untoward results, but from similar repeated exposures there seems to be a cumulative action; (4) in some individuals there is an action analogous to that of sunburn, and in addition a falling out of the hair. Should it be ascertained that the hair does not grow again, we would have a very simple method of depilation.—*Deutsche medicinische Wochenschrift*, 1897, No. 7, S. 105.

Traumatol (Iodokresin).—DR. W. SCHATTENMANN describes this as a violet-red, amorphous, remarkably fine, bulky, odorless powder which results from a chemical combination of cresylic acid ($C_6H_4CH_3OH$), from coal-tar cresol, and iodine, containing about 54 per cent. of the latter. It is insoluble in water, acids, and alcohol, slightly in ether, but readily soluble in chloroform and strong alkalies. Laboratory-experiments demonstrated that it is not poisonous and that it possesses antiseptic properties. It is employed as a powder, gauze, vaseline, glycerin, crayon, plaster, and collodion. It may be prepared as a 5 to 10 per cent. traumatol-zinc-paste, 10 per cent. traumatol-lanolin-vaseline, or 10 to 50 per cent. traumatol-chloroform. For venereal ulcers, after preliminary cleansing, it brings about a speedy cure. The crayons are useful for the healing of fistulous tracts, dissolving more slowly than those made of iodoform. For genital erosions the collodion is preferred. As a powder, or with chloroform, excellent results have been obtained in syphilitic affections of the mucous membranes. For various operations performed in genito-urinary work—phimosis, buboes, gland-extirpations, papillomas, warts—the application of the powder, which is covered over with the collodion, is recommended. It addition to its antiseptic properties, its drying and unirritating effects are so marked that its field of usefulness embraces a considerable number of skin-diseases. The results obtained upon seventy-five patients who were treated by this remedy, used alone, show conclusively that we have a valuable addition to our therapeutic resources.—*Therapeutische Monatshefte*, 1897, Heft 2, S. 89.

Some Important Facts about Chloroform.—DR. H. A. HARE concludes that while this drug without doubt acts as a general depressant poison to the respiratory centre and the heart, in the same manner as it paralyzes all living protoplasm when applied in excess, when improperly given by inhalation it produces a death equivalent to that resulting from hemorrhage, which is a failure of the respiration, not so much from a direct depression of the respiratory centre as from its starvation of blood; and while the tendency of the drug is to depress and dilate the heart, just as it dilates the vessels of which the heart is merely a highly specialized part, the failure in the pulse rests upon vasomotor palsy, the patient becoming pulseless because the heart has not any blood to pump. This view is confirmed by the laboratory-tracings of many independent investigators, extending over many years and made in all parts of the world, all of which show a fall of blood-pressure. It is confirmed by Hill, who has seen the abdominal vessels engorged with blood, the medulla almost bloodless, and the heart still pumping, although respiration had ceased. Clinically, several observers have used inversion with compression of the floating ribs in artificial respiration, which has forced blood into the chest and saved life. There have been frequent reports of death from chloroform while the patient was sitting up or half-recumbent, because the blood-paths, being dilated, this posture favored anæmia of the vital centres. Again, it has been proved both experimentally and clinically that the best vasomotor stimulant—belladonna or atropine—given before the chloroform increases its safety, and that compression of the limbs by bandages does likewise. Finally, Hill has shown that abdominal compression also produces resuscitation by sending blood to the heart. On the contrary, saline trans-

fusion is useless, because the dilated blood-paths will receive all the saline for a long time before they will overflow toward the heart, for as fast as the fluid flows in they dilate. The question of blood-pressure is most important, and therefore in using chloroform the head must be kept low, precede its administration by atropine hypodermatically, bandage the limbs if the patient is feeble or already bloodless, and, if necessary, place compresses on the abdomen and apply them deeply by pressure if a failing circulation is developed. Since an intact respiratory centre means regular breathing, we watch this function to determine the dose of chloroform actually inhaled, and because any variation in this function, as shown in irregular breathing, means that the chloroform is disordering arterial tension.—*Therapeutic Gazette*, 1897, No. 2, p. 73.

Schleich's Infiltration-anæsthesia.—Dr. Gerhardi briefly sums up the advantages of this method as follows : (1) It is devoid of danger and diminishes, to a very great extent, the necessity for general narcosis. (2) Small operations, and in a sitting posture, can be done in the practitioner's office and without subsequent narcosis-katzenjammer, so that the patient can return to his home. (3) He can operate alone, because the anæsthesia and operation go on simultaneously. (4) The patients now readily allow themselves to be operated upon.—*Münchener medicinische Wochenschrift*, 1897, No. 6, S. 138.

Eucaine. – Dr. Gaetano Vinci, reviewing the literature, cites Vollert, Best, and Wüstefeld only as presenting unfavorable reports. These report burning, lachrymation, blepharospasm, conjunctival and ciliary injection, mydriasis, and slight paresis of accommodation. While the author used a 2 per cent. solution, the authors quoted employ stronger ones (Vollert, 5 ; Best, 4 ; and Wüstefeld, 5 and 10 per cent.). While a 2 per cent. solution may cause slight burning, it lasts at most half a minute. As for injury to the cornea, mentioned by Vollert and Wüstefeld but denied by Berger and Deneffe, it can be said that cocaine, under similar circumstances, acts more energetically. From a considerable number of observations upon animals the author concludes that practically there is no danger in this direction. As for the other objections, they seem to be determined as non-existent by other observers. Further than this, eucaine seems to possess a slight antibacterial action, in which cocaine is entirely wanting.—*Therapeutische Monatshefte*, 1897, Heft 2, S. 99.

Dr. M. Pouchet presents a preliminary note. Its toxic equivalent is almost equal to that of cocaine, but presents the inconvenience of not presenting, in certain cases, the prodromal phases of intoxication, so that poisonous symptoms, it may be fatal ones, may suddenly declare themselves. The intensity of its action upon the heart, equal if not greater to that of cocaine, leads us to believe that this should be considered as a dangerous drug, while the anæsthesia which it produces is more intense than that of cocaine under the same circumstances. After small doses subcutaneously injected into frogs there followed a considerable slowing of the heart-beats and a very manifest modification in the form of the cardiac revolution. In the same dose cocaine does not produce this result.—*Les Nouveaux Remèdes*, 1897, No. 3, p. 75.

MEDICINE.

UNDER THE CHARGE OF

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On Retroperitoneal and Peritoneal Lipomata.—ADAMI (*Montreal Medical Journal*, January and February, 1897) reports two interesting cases of retroperitoneal lipomata and carefully reviews the literature on this subject. Case I. was a man, aged forty-five years. In January, 1892, the patient noticed that his abdomen was swelling and that he was becoming emaciated in other parts of the body. No other symptom was complained of. The abdominal swelling and the general emaciation increased gradually. Aspiration failed to reveal any fluid, and a tumor was suspected. An exploratory incision was made in May, 1892, when a solid, uniform growth was found to occupy the whole abdominal cavity. The relations of the tumor, however, contraindicated its removal. Recovery from exploratory incision followed, but in October the attending physician noticed an area of apparent softening in the umbilical region. On aspiration nine pints of sweet pus were removed. From this time on until his death, in February, 1893, about sixty pints of pus were removed at repeated aspirations. Up to the last there was an entire absence of pain and of any disturbance of the bowels or kidneys. The autopsy revealed a large, lobulated, fatty tumor, springing from the left renal region and almost filling the abdomen. The descending colon passed down over the front of the tumor, while the remainder of the intestines were found to the right and behind the growth. The tumor was easily removed, bringing with it the left kidney and the spleen. The former was completely imbedded in the growth and was partially atrophied by pressure; the latter was only incompletely imbedded in the mass. The lower and anterior part of the tumor presented a large cavity containing grayish-green pus. Upon the upper anterior surface were three or four lenticular lobes, composed exclusively of fatty tissue, completely cut off from the main mass by loose connective tissue. Sections from various parts showed the growth to be made of pure and typical fatty tissue. In many portions mucoid degeneration was advanced, the fat having almost entirely disappeared and the characteristic myxomatous cells being well seen. One portion presented a markedly sarcomatous appearance. Adami believed then that he was dealing with a huge retroperitoneal lipoma, which, from its tendency to undergo mucoid degeneration, would be termed by some a lipoma myxomatodes. The tumor weighed 41 pounds, and with fluid lost would probably reach 44 to 45 pounds.

The specimen from Case II. is in the Army Medical Museum at Washington. It was removed from a man, aged sixty years, who had always been

healthy. The tumor was first noticed in February, 1869, when it was the size of an ostrich egg. It gradually increased in size until February, 1871, when the patient died from the effects of a cold contracted three weeks previously while attending the funeral of a friend. Patient was much emaciated. The autopsy revealed a tumor weighing 41.5 pounds, of irregular, flattened shape, and everywhere adherent to the abdominal wall, which was infiltrated and distended with serum. The liver, intestines, and stomach were compressed, the latter being adherent to the diaphragm. The tumor originated in the left renal region, the left kidney being atrophied, flattened, and partially imbedded in the growth. It contained a cyst the size of a walnut, while the right kidney was also cystic. The descending colon passed over the front of the tumor. Microscopic examination showed the tumor to consist largely of adipose tissue in a voluminous stroma of embryonic connective tissue, with abundant nuclei between the fat-cells.

The points of similarity in the cases are the long duration of the growth, accompanied by marked emaciation, but without any grave general disturbances. In both the tumor was fatty, with a kidney imbedded in it, and, further, in both the mass was retroperitoneal with the descending colon passing down over it.

Such huge retroperitoneal growths of this nature are not frequent. Virchow does not speak of them in his work on tumors. Adami has collected forty-two cases from the literature. The greatest number of cases have been recorded in France, where the fullest description of them so far was made by Ferrillon, who collected fifteen cases. The tumors do not all have the same origin. A large number originate in the region of one or other kidney, others lower down in the abdomen, and still others in the mesentery or radix mesenterii. The condition is more frequent in the female than in the male, the proportion being 25 to 16. It occurs on one side about as frequently as on the other. It is commonest between the ages of thirty and fifty years. The growth in Lauwer's case was noticed fourteen days after birth, and at seven years, when it was removed, it weighed 6 pounds, the child's weight being 20 pounds after removal. The tumor grows very slowly, on an average between two and three years elapsing between its first appearance and removal or death of the patient. Ferrier and Guillemain record cases lasting from seven to twelve years. The majority weigh over 20 pounds, while Waldeyer had one which weighed 63 pounds.

Owing to the fluid character of the fat in many of the cases abdominal fluid has been suspected, followed by aspiration, with negative results. The occurrence of a fluctuating abdominal tumor from which, on repeated puncture, no fluid is obtained, should strongly suggest a lipoma or myxoma. A symptom not infrequently found is œdema of the lower extremities, due to venous obstruction in the abdomen.

Histologically, the majority of these abdominal tumors are of the nature of a lipoma myxomatodes. Calcareous deposits and osteoid appearances may be seen in the older portions of the growth. The benign character of the tumor is shown by the fact that in only one instance (Tillmann) was there any recurrence after removal.

Of the forty-two cases collected from the literature, the tumor was removed in twenty-six, either wholly or almost wholly. The operation was successful

in twelve cases, or 46.1 per cent. As a rule, there is but little evidence of surrounding inflammatory disturbance, and the peritoneal covering is usually smooth and glistening. The mass usually peels out easily from its surroundings. The chief danger from the operation is the possible occurrence of gangrene of the intestine. The tumor carries before it the intestine and the mesenteric vessels, and the latter require to be cut in the removal of the growth, endangering gangrene of the corresponding part of the intestine. Gangrene of the intestine followed in most of the fatal cases subsequent to operation. Two methods of procedure are open in operating. Preferably a lumbar or lateral incision should be made and the tumor approached from behind. By this method the least possible injury to the peritoneum and intestine results. Should this method not be feasible, the tumor must be reached by an abdominal incision and free resection of the involved portion of the intestine made.

There are, then, a number of points suggesting a retroperitoneal lipoma—a very slowly growing tumor, situated usually more to one side than another and causing little general disturbance beyond progressive emaciation and dyspnœa; the tumor gives a sense of fluctuation and is crossed by a portion of the intestine; repeated aspirations fail to reveal the presence of any fluid.

On the Urinary Excretion in Gout and the Effect of Treatment with Colchicum and Salicylate of Sodium.—FAWCETT (*Guy's Hospital Reports*, vol. lii., 1896) gives the results of the analysis of the urine in thirteen cases of gout, with the effects of colchicum and salicylate of sodium treatment, as shown by changes in the urine. The total acidity of the urine and the daily excretion of urea and uric acid are determined. All the cases were cases of chronic gout, some of which passed through acute attacks of arthritis during the observation-period. As to the excretion of uric acid, he finds the amount eliminated distinctly below normal between acute attacks, but varying greatly from day to day. In the acute stages the uric-acid excretion is much higher than between the attacks, but even then does not reach the normal average for the healthy person. These results accord closely with those of Garrod and Pfeiffer, although the latter found the uric-acid excretion above normal in some of the cases with acute attacks. An increased acidity of the urine, and a diminution in the uric-acid elimination, were not found associated, the relationship in the two factors being quite irregular. This is opposed to Haig's theory as to the etiology of gout—namely, that a uric-acid retention is associated with a diminished alkalinity of the blood and a corresponding increase in the acidity of the urine. No relationship between the amount of urine voided and the quantity of uric acid excreted was found. The acidity of the urine and the quantity of urea eliminated corresponded closely, a rise or fall of one being associated with a rise or fall of the other. The uric acid was not increased by colchicum; on the contrary, in the majority of instances its elimination was distinctly diminished. Garrod also holds that the good effect of colchicum is not due to its removing the uric acid from the system. How it acts apart from relieving the pain in acute attacks is still unknown. It does not act as a diuretic, nor does it increase the urea elimination. Fawcett found, as Haig had already observed in gout, that the uric-acid elimination is markedly

increased by the administration of salicylate of sodium. It also produced a distinct analgesic effect and a slight increase in the urea elimination. Bohland believes that the increased uric acid after salicylate administration is not due to a clearing out of stored-up uric acid, but to an increased production from an increased destruction of leucocytes. These liberate an increased amount of nucleins, from which, as Horbaczewksi believes, the uric acid is derived. The salicylate was found to possess but slight diuretic action.

On the Elimination of Alloxuric Bodies in the Urine and their Relationship to Gout —MALFATTI (*Wiener klin. Wochenschrift*, 1896, No. 32, abstracted in the *Centralblatt für innere Medicin*, 1897, No. 10) found in a patient suffering from gout that during an acute attack of arthritis the quantity of alloxuric bodies (uric acid and xanthin bases) eliminated in the urine was considerably higher than the amount excreted between the acute attacks. However, even during the acute attack the alloxuric bodies did not reach the normal amount for the healthy individual. This is in direct opposition to the view of Kolisch, who believes that the alloxuric bodies are increased in gout. Malfatti believes that the accurate experiments of Schmoll, Vogel, and Magnas Levy show that gout is a disease in which the normal metabolism is so changed that the nitrogen elimination is no longer an accurate representation of the nitrogen ingested, but that periodically the excretion of nitrogen far exceeds the amount taken in, while at other times it is considerably less and there is as a result an accumulation of it within the organism.

The Excretion of Alloxuric Bodies in Gout and Contracted Kidney.— ROMMEL (*Zeitschrift für klin. Medicin*, Bd. xxx. Heft 1 u. 2) opposes the view of Kolisch that the alloxuric bodies are increased in gout, and that the graver the involvement of the kidney the smaller is the excretion of uric acid and the greater is the excretion of the alloxuric bases (xanthin bases). He quotes the views of Schmoll and Weintrand, who held that the excretion of the alloxuric bodies (uric acid and xanthin bases) in gouty patients does not exceed that for the normal individual unless possibly at the onset of an acute attack. Rommel found in a patient with gout and chronic lead-poisoning that the elimination of the alloxuric bodies was about normal, and a separate estimation of the uric acid showed it to be excreted in normal quantity. The patient had marked evidences of contracted kidneys, so that Rommel's results are directly opposite to the conditions found in gout and granular kidneys by Kolisch. Another case with interstitial nephritis, but without gout, showed an increase of the total alloxuric bodies, with, further, a marked increase in one of the individual members of this group—namely, the uric acid. This case is strong evidence against the theory of Kolisch that the kidneys are the organs where the greatest part of the uric acid is formed. Here is a case where there was serious disease of the kidneys and yet an extraordinarily large amount of uric acid was excreted.

Remarks upon Virtual or Relative Mitral Stenosis —ROLLESTON and DICKINSON (*The Lancet*, March 6, 1897) report three cases of what they term virtual or relative mitral stenosis, in which the mitral valve exhibits all the

characters of a mitral stenosis, but on so large a scale that stenosis does not actually exist. The segments are thickened and welded together, and depressed into the cavity of the ventricle so as to approach the form of a funnel. The orifice, however, is absolutely as large as or larger than natural, though small in relation to the ventricle, which is dilated. Clinically, the blowing mitral regurgitant murmur is always present, and frequently also a more or less typical presystolic murmur. They do not think that this relative stenosis is due to the dilating effect of a dilated ventricle on a previously stenosed mitral orifice. They hardly think that a valve which has once attained an important degree of stenosis and rigidity can afterward become uniformly enlarged, nor do these cases to which they refer belong to that group where the stenosis has undergone widening from laceration of the segments or rupture of the chordæ tendineæ. Rolleston and Dickinson think that a more satisfactory explanation is that the valve, though naturally tending to stenosis, has been held open from the first by the dilatation of the ventricle. In such cases the disease of the valve and of the ventricle must have originated at or about the same time. Most of the cases of relative stenosis are in cases of adherent pericardium in young persons, arising in the rheumatic pericarditis of childhood and attended equally by dilatation of the ventricle and mitral endocarditis of that variety, which, if free to run its natural course, would terminate in stenosis. Some are instances of aortic regurgitation, the dilatation of the ventricle from which has apparently overtaken the mitral disease, while the valve is still pliant and extensible. They consider this state of the mitral valve clearly beneficial in the class of cases in which it is found. The orifice, being large, does not obstruct the circulation in the lungs, while the tendency to stenosis moderates the amount of regurgitation. The term "relative" stenosis is preferred to "virtual" stenosis.

Priapism.—In the K. K. Gesellschaft der Aerzte of Vienna PROF. E. LANG recently presented a remarkable case of priapism lasting for many years. The patient, forty years old, had increased knee-jerk, the scleral and corneal reflexes were lessened, those of the soft palate and pharynx absent. There was slight tremor, perhaps due to considerable consumption of beer and wine. There were no signs of injury or disease of the brain or cord; no history of injury of the corpus cavernosum; no sign of inflammation; no cause for thrombosis; no sign of gout or tumor. The patient had never masturbated; copulated regularly, but not excessively; had one child. Formerly emissions were frequent. The patient had been in occupations requiring horseback-riding, but the erection began in the eighteenth year, before riding, and did not cease when in other occupations. The condition of the reflexes made it possible that the priapism was the result of a general neurosis. As the corpus cavernosum urethræ did not take part in the erection, Lang raised the question whether it has not a special centre, distinct from that of the corpora cavernosa penis. — *Wiener klin. Wochenschrift*, 1896, No. 45.

Anchylostomum in Horses.—RATHONYI has made the interesting discovery that horses may harbor the anchylostomum duodenale. In a certain mine in Brennberg anæmia had long been observed among the workmen, and

the presence of the parasite was confirmed by Prof. Kahler some years ago. The usual conditions prevailed in the mine—that is, there were no cesspools, but feces were deposited at will. Infection occurred only in men working in the mine, and not in their families, although the men were in the habit of going to their homes with dirty hands. It therefore occurred to Rathonyi to examine the feces of the mine-horses, and he there found enormous numbers of eggs from which larvæ could be cultivated The horses gave no evidence of disease, though invaded by the parasites without exception. The men who worked near the horses were those who were most severely infected. In a small mine a short distance from the first mentioned, without horses, no severe cases developed among the miners, although infected workmen were engaged there. For these reasons the author thinks horses are important factors in the infection, perhaps taking the part of intermediate hosts.— *Deutsche med. Wochenschrift*, 1896, No. 41.

An Asthma Attack Examined by Roentgen's Method.—MAX LEVY-DORN (*Berliner klin. Wochenschrift*, 1896, No. 47) reports an interesting observation made on a patient with dry bronchitis, secondary emphysema, and asthma. The attacks were excited especially by change of air, as in passing from one room to another, and had rendered the patient a complete invalid. Physical examination revealed a thorax deep from before backward; apex-beat, liver, and spleen not palpable; lung-boundaries freely movable, reaching to the twelfth rib behind, the eighth in front; heart-dulness beginning above on the fifth rib; loud rhonchi, especially on the left side; expiration prolonged. The sputum was tough and mucous.

Examined before the attack, the X-rays made it clear that the heart was dislocated, but not enlarged. The apex was in the sixth interspace too far to the right; the right side was some distance from the right edge of the sternum. In an attack of asthma it could be seen that the left half of the diaphragm descended with great rapidity, raised slowly, fell quickly, and so on. The right half, on the contrary, did not move at all, even in forced inspiration. This lasted some minutes, during which the harsh asthmatic breathing was audible. Then an attack of coughing began; the diaphragm, right as well as left, made deep inspiratory and strong expiratory motions; tough mucus was expelled, and the attack was over. The most remarkable feature of the attack was the difference in the two halves of the diaphragm. Both sides showed expiratory dyspnœa, but of different degrees. This the author explains by the assumption of a depression of the right side as the result of distention of the lung. Evidently in this case a cramp of the diaphragm could not explain the condition. The demonstration that the asthmatic dyspnœa may be due to causes in the bronchi of one lung is also interesting, and suggests the usefulness of similar observations in other cases in order to see whether this is a frequent cause of asthma.

Palpation in the Warm Bath.—LENNHOFF (*Berliner klin. Wochenschrift*, 1896, No. 48) suggests the use of the warm bath as an aid to diagnosis. This has been used at times by various observers, but Lennhoff has for some time practised it on a large scale. The patient is placed on a support suspended from the sides of the bath. After ten or fifteen minutes in water as hot as

can be borne the skin becomes soft, the muscles relaxed. Many things can then be felt in the abdomen and pelvis that are otherwise inaccessible. There are all the advantages of narcosis without the inability to control the patient's movements at will and so assist in the examination, as in palpating tumors affected by respiration.

SURGERY.

UNDER THE CHARGE OF

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Operative Interference in Typhoidal Perforation.—ARMSTRONG (*British Medical Journal*, December 5, 1896) refers to three cases in which he had operated unsuccessfully, and one in which recovery had taken place. He says that of twenty-three cases in which operation was undertaken where the diagnosis of typhoid was certain, four recovered. Although this is but a small proportion of recoveries, what other treatment affords even this slight hope? He believes that in those cases where the patient is in a very poor condition for operation, suffering from typhoid poison, with very poor reparative and recuperative power, that we should give the patient this his only chance, and operate or hand him over to the surgeon. If there is clinical evidence that the perforation is in the colon, or that it is likely to remain localized, then he would say, wait for abscess-formation. If, on the other hand, the signs point to a perforation having occurred into the general peritoneal cavity previous to the formation of living adhesions, it would seem that laparotomy, closure of the perforation, thorough irrigation with normal saline solution at 110° F., and very free drainage, offer the only hope of recovery. This interference should not be undertaken until the condition of collapse has passed off, nor in patients who are evidently moribund.

Perforations occurring during convalescence offer greater prospects of recovery. The author closes the perforation by two or three rows of Lembert sutures running in the longitudinal axis of the bowel.

Traumatic Disease of the Vertebræ.—HENLE (*Arch. für klin. Chir.*, Band 52, Heft 1, 1896) reports six cases of injury to the vertebræ following upon a traumatism. In these cases the trauma which occasions the disease may be varied in its nature : it may be a direct blow upon the vertebræ, a severe fall upon the shoulders or back, or a violent bending together of the body, in that manner compressing the vertebræ.

The symptoms are only a severe pain in the particular portion of the spinal column, with possibly some slight anæsthesias or palsies, which pass away, and the patient continues his ordinary vocation. After a period of freedom varying from weeks to months, severe pain returns in the vertebræ; it may be an intercostal neuralgia in the neighborhood of the traumatism, or slight interference with the motile function of the lower extremities; the gait is uncertain, and when the patient is seen for the second time, instead of being perfectly well, he is in a serious condition after apparent health for weeks or months after the accident, and there are present a marked kyphosis and more or less of a hump. The disease is usually situated in the thoracic vertebræ; the most prominent vertebra and its neighbors are painful on pressure. The kyphosis can be reduced by suspension, but the gibbosity cannot. The presence of this gibbosity, as also the motility of the vertebræ, and therefore the possibility of reducing the kyphosis, is in strong contrast to the conditions found to be present in traumatic arthritis deformans. The author would divide this disease into three stages: the first, the traumatism and the accompanying pain and paræsthesias; the second, in which for a varying period the patient is entirely free from pain or any symptoms; and the third, in which the gibbosity, kyphosis, pain, and paralytic symptoms again return. It is evident that these stages may vary in length according to the severity of the traumatism, and that the first may be so drawn out that it extends over into the third without the period of apparent cure intervening.

The disease is probably the result of a softening of the bone due to the loss of vitality which arises from the fracture or contusion it sustains, and the reparative process which is commenced by the deposition of callus, which is, however, too soft, and yields to the pressure which is exerted upon it.

The differential diagnosis is to be made only from tubercular disease, unless perhaps a rare case of gumma or a tumor involving the vertebræ, when such a disease should chance to make its first manifestation after the reception of an injury. The diagnosis from tubercular disease can, of course, only be made after a long and careful study of the case and a minute observation of the symptoms as they arise.

The treatment is by rest in bed, with extension, or by the use of proper apparatus when, for any reason, the patient cannot be confined to bed.

Bimanual Examination of the Urinary Bladder.—MORRIS (*Lancet*, October 31, 1896) calls attention to the advantages of bimanual examination of the urinary bladder while the patient is anæsthetized and the bladder empty. It is particularly worth a trial in cases where there is troublesome hæmaturia —that is, a hæmaturia that prevents the use of the cystoscope. The differential diagnosis between renal and vesical hemorrhage is sometimes very difficult, as also the diagnosis of vesical calculi when they lie behind an enlarged prostate or are encysted in the bladder. In cases of vesical papillomata the sound affords us no aid, and it is in these cases that this author has found this method of greatest service. He reports three cases where this method made a diagnosis possible which was undetermined by other means.

Achillodynia.—ROSSLER (*Deut. Zeit. für Chir.*, Band 42, Heft 3) reports a number of cases of this painful affection of the foot, whose symptomatology

is the following : the patient can neither stand nor walk without pain, which is referred to the insertion of the tendo Achillis ; the objective symptoms are a tumor at that point, slightly painful on pressure, of a hardness almost equal to that of bone. Relief is obtained by sitting or lying down.

The author has studied most carefully the pathology of this disease, making over 250 post-mortem examinations, including thirty upon newborn infants. He found that very few bursæ are exempt from some chronic changes which are hypertrophic in character, with an increase in the periosteum and hyperostosis, the thickened periosteum sometimes showing patches of hyaline degeneration.

The acute form of the disease is simply more acutely inflammatory in character, with a hypertrophy of the surrounding adipose and cellular tissue, as well as that which lies within the bursa, the whole process resembling the condition found in arthritis deformans.

The treatment recommended is by compression with bandage and moist sponge, or, in more difficult cases, the opening of the bursa on the external aspect and packing with sterilized gauze.

Traumatic Injuries of the Liver and Bile-ducts.—TERRIER and AUVRAY (*Rev. de Chir.*, October 10, 1896), after a critical study of this subject, present a summary of the cases found in medical literature to the number of forty-six, of whom thirty-three recovered and thirteen died.

These results are interesting, although, as noted by the authors, they do not probably show the actual percentage of mortality, as there is a well-known tendency of writers to report only their successful cases.

The successful cases were those in which operation was undertaken immediately before the great hemorrhage had taken place and the peritoneum infected. The extent of the lesion was smallest in the cases which recovered.

From the statistics collected the authors would conclude that an exploratory laparotomy in cases of traumatic injury of the liver should be performed as quickly as possible ; one can thus arrest hemorrhage, which tends to infect the peritoneum, and in case the hemorrhage has already ceased make certain, by suturing the wound, that no further hemorrhage will take place.

Two Cases of Perforating Gunshot-wound of the Kidney.—RICHARDSON (*Annals of Surgery*, December, 1896) reports two cases of wound of the kidney, of which he says these two cases resemble each other in most of their essential features. In both the weapon and the missile were the same. In both the liver and kidney only were perforated ; there was a moderate amount of free blood in the abdominal cavity ; there was free retroperitoneal bleeding ; the patients' general condition was the same. In both the body of the organ was completely perforated and a portion of its secreting-tissue destroyed. In both an extensive exploration preceded local measures. In the renal lesion they differed, however, to an extreme degree. In one the vein and the pelvis were hopelessly lacerated, in the other they were intact. In one a nephrectomy was resorted to, in the other simple drainage. In the former death ensued, in the latter recovery.

The essential difference, therefore, lies in the nephrectomy which the more serious lesion rendered necessary in the first case. " Had it been possible to

preserve what remained of this kidney, would not the result, to a reasonable certainty, have been different?"

"Assuming that death resulted in this case from the inability of the remaining kidney to carry on successfully the work of excreting urine—the most frequent cause of death after the removal of an active kidney—one cannot but wonder whether the injured kidney might not have been saved; whether it would not have been better simply to drain the kidney in the hope that, even if too badly hurt for ultimate recovery, it might for a time do some of the work of excretion pressing so heavily on the other side; whether gangrene would surely follow laceration of the renal vein, and whether the well-known anomalies of the great vessels of the kidney might not justify the hope that in some way the vitality of the organ might be kept up; whether, finally, it would not be better on the whole to treat conservatively all wounds of the kidney, even the most extensive." These questions can be settled only by additional experience.

Coxa Vara Congenita.—This disease generally makes its appearance, according to Hofmeister, about the age of puberty. KREDEL (*Cent. für Chir.*, October 17, 1896) reports two cases which he believes are of a third type, which he classifies as congenital. The cases presented all the symptoms of coxa vara, involving both hips and being combined with other malformations of the limbs—namely, marked genu valgum and a severe pes equino-varus. The first case was not seen by the author until the patient was three years old, and not until he saw the second case, only five months old, did he realize that the deformity was truly congenital. In this second case there was a unilateral coxa vara, with slight genu valgum and a severe pes equino-varus, while in the other limb there was a malformation of the knee-joint with absence of the patella, marked genu valgum, and pes equino-varus. The position preferably assumed by the child showed that the deformity was of intrauterine origin and due to a want of space. The limbs lay parallel, but the sound limb was abducted, while the deformed limb was adducted. This position, so constantly maintained, showed that this had been the position in intrauterine life. The case differed from the deformity seen in rhachitic children in that there was marked adduction present, which is always absent in those cases. These cases showed that a deformity in this joint may originate *in utero* and give rise to coxa vara in the early life of the child.

The Relation of Leucoceratosis to Epithelioma.—In a communication to the French Surgical Congress LE DENTU (*Rev. de Chir.*, December 10, 1896) draws a comparison between the clinical and pathological relations of these tumors. He arrives at the following conclusions:

1. The relations of the epithelioma with leucoceratosis, affirmed by the majority of dermatologists and by several surgeons, merit particular attention.

2. The study of this affection has led observers to admit of several varieties, of which all perhaps are not equally predisposed to change.

3. Histological researches show that this disease is essentially characterized by the hyperkeratinization of the epithelium of the mucous membranes; that the development of the epithelioma is often preceded by a partial de-

keratinization, followed by cellular infiltrations, but that this may sometimes take place beneath and sometimes in the midst of the corneal layer.

4. The facts reported, without counting those which he remembers but vaguely, lead him to think that the malignant change of these masses is pretty frequent.

5. If certain leucoplastic epitheliomas of the tongue resemble ordinary epitheliomas of this organ—if those of the cheek appear as malignant as those which have another origin, perhaps in the tongue or the lips—this disease has from time to time a special mode of development, and is less severe than the common cancroid.

6. When the leucoceratosis progresses from other origins than those which have already been the seats of operation, the cure may continue perfect on the surface and in the region of the wound.

7. Should old or newly formed masses be attacked by epitheliomatic degeneracy, some distance from the point already operated upon, the wound and adjoining parts may remain untouched by any change.

8. From the foregoing, it results that if the epitheliomatic changes, in the present state of science and in spite of the tolerable frequency, may it not be considered as an inevitable phase of the disease, one may and must think that it is caused by an inherent predisposition to leucoceratosis itself.

9. As long as the leucoplastic masses are of a simple nature it is permissible to try the efficacy of medical treatment, directly or indirectly, before having recourse to surgical methods; but prolonged waiting always offers some risks.

10. On the other hand, any change represented by a papilliform development—a fissure, an exulceration having resisted the thermo-cautery or a mild solution of caustic—renders surgical intervention necessary. To be efficacious this must be early and radical.

A Series of Sixty-six Operations upon the Kidney.—ALBARAN (*Rev. de Chir.*, November 10, 1896) reported a series of sixty-six operations upon the kidney to the French Surgical Congress, with a mortality of only 9 per cent., or six deaths.

The operations were the following: seven nephrectomies, with one death; one partial nephrectomy, no death; twenty-four nephrotomies, two deaths; five nephrolithotomies, two deaths; anuria, operation on tenth day, death; twenty-three nephrorrhaphies, no deaths; four exploratory nephrotomies, no deaths.

The author observed after a number of his operations reflex phenomena of a very grave nature, always accompanied by an oliguria of more or less marked character. The most marked symptoms were incoercible vomiting, with marked epigastric pain, or the lumbar regions became painful subjectively and on pressure; the patient was pale, anxious, with contracted pupils, small, rapid pulse, and a temperature about normal. These symptoms cease at the end of from twenty-four to thirty-six hours, or, on the other hand, they may continue without any interruption and despite the intravenous injection of artificial serum. In two cases of movable kidney these symptoms persisted for two and three days, and after great anxiety had been caused by the patient's condition all the symptoms ameliorated and disappeared upon

the ingestion of hot grog. The author observed death occur in a case of nephrotomy and one of nephrolithotomy on the third day; the autopsy, however, failed to reveal the cause of the deaths.

The Sterilization of Hypodermatic Syringes by Boiling.—HOFMEISTER (*Cent. für Chir.*, July 4, 1896) details a method which he has found successful for the sterilization of hypodermatic syringes by boiling. It is based upon the fact, which he discovered, that ordinary leather which has lain for twenty-four hours in a 2 to 4 per cent. solution of formalin can be boiled without losing its strength, softness, and suppleness.

This method can be applied only to such syringes as are made of metal, glass, and leather, and are not cemented but screwed together.

The cap and piston are removed and freed from oil by the use of ether. They are then placed for from twenty-four to forty-eight hours in a 2 to 4 per cent. solution of formalin. After a thorough washing to free them from the formalin they are ready for boiling.

In boiling care should be taken to expel all the air from the syringe by holding it under water and moving the piston in and out. It should then be placed in cold water to prevent the glass from cracking, and gradually brought to the boiling-point.

The formalin solution should be employed from time to time, but is not necessary every time the syringe is boiled.

If the piston fits properly after the oil has been removed, it will fit after the boiling.

Vesical Stone and Prostatic Disorders.—In dealing with this subject in his Bradshaw lecture HARRISON (*British Medical Journal*, December 12, 1896) says of cystotomy that he believes the tendency to avoid the perineal operation is not productive of the best results in many cases in which the infected bladder is greatly relieved and often permanently cured of a marked cystitis by the thorough drainage secured in this operation. The suprapubic operation, the author believes, has its value, and is of service in explorations of the bladder and the removal of new growths or in cases of very large stones, though the great mortality seen in the latter cases must be remembered. The success attendant upon the operation of litholapaxy has been so great that no one can question its value and its usefulness in the great majority of cases. The old objection that the stone is more liable to recur has been disproved, and an increasing improvement in the technique of the operation is gradually decreasing the number of recurrences. The fact that these recurrences are found in cases over sixty years of age, or where there is some impediment in the urinary function, leads the author to conclude that it is usually an enlarged prostate and the attendant atony of the bladder which are responsible for the recurrence of the stone.

In this connection the author believes there are certain cases of recurrent stone, due to enlarged prostate glands, in which castration, by relieving the hypertrophy, prevents the recurrence of the stone.

In regard to castration and vasectomy, the author believes that more rapid results are obtained by castration than by vasectomy, and that in urgent cases castration should be the operation of choice. There are grounds, how-

ever, upon which he would prefer vasectomy, and then he recommends its performance in two operations, permitting the effect of the first operation upon the nervous system of the patient to wear off before the second one is performed.

He draws especial attention to carcinomata of the prostate, which he believes frequently goes undetected. They occur in males of about fifty-five years of age. When felt from the rectum the gland is hard, bossy, and insensitive. They seldom bleed much or ulcerate unless damaged by a catheter or sound. There is seldom either sudden or complete retention or even distention of the bladder. Reflected pains and painful irritation of the bladder are frequently complained of. These carcinomatous prostates and the fibrous variety of hypertrophied prostate are the ones in which castration or vasectomy produces no result.

The author then describes a form of perineal lithotomy which he employs : the median incision is followed by the introduction of the index-finger, and this again by the introduction of special crushing-forceps, which grasp the stone and crush it, when it is evacuated through the perineal wound. The advantages claimed are the rapidity and ease with which large stones are removed. It can be used in old and feeble subjects. It provides better drainage and more complete access to the bladder. The mortality is very small.

OTOLOGY.

UNDER THE CHARGE OF

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Keloid Tumors of the Auricle.—SHEPPEGRELL reports two cases of keloid tumor of the auricle, the result of piercing the lobule for ear-rings. The tumors were removed after local injections of a 4 per cent. solution of cocaine muriate. There were no recurrences after six and fourteen months, respectively.—*New York Medical Journal*, October 17, 1896.

The Degenerate Ear.—Scientists and neurologists, however, are forced to lay little stress upon the occurrence of any one or two stigmata. It is only the combination of several that carries weight, as indicative of a corresponding degeneration of the cerebral tract. (Editorial in *American Medical Review;* see *Laryngoscope*, vol. i. No. 4.)

Hæmatoma Auris.—McCONACHIE reports the occurrence of three cases of hæmatoma auris in the sane (*Journal of Eye, Ear, and Throat Diseases*, vol. i. No. 3). In the first case the blood-tumor was considered to be an idiopathic one. The sac was opened three times, refilling twice, but the third time injections of carbolic-acid solution (strength not given) were followed by agglutination of the perichondrium to the cartilage and healing with

considerable deformity. No history of traumatism could be found in this case.

In a second case, traumatism being the cause of the formation of the blood-tumor, prompt incision without any injections was not followed by healing. Finally, after several incisions, recovery ensued after an injection of a car-bolic-acid solution and tight bandaging. There was considerable deformity of the auricle subsequently.

In a third case, also caused by violence, prompt incision, evacuation, and firm bandaging were followed by quick recovery, with the usual puckering of the auricle.

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Surgical Exposure of the Middle Ear.—URBANTSCHITSCH (*Wiener klin. Wochenschrift*, Jahrg. ix. No. 29) reports his results and experiences in the surgical exposure of the middle-ear cavities in seventy-two cases. "Operative exposure of the middle-ear cavities, the so-called radical opera-tion of the middle ear, consists in the formation of a wide communication between the auditory canal and the drum-cavity on one side and the mastoid antrum and varying areas of the mastoid process, so that all the parts named are thrown into a common cavity. At the same time the malleus, incus, and the remnant of the membrana tympani are removed and the posterior wall of the cartilaginous auditory canal is split and thrown back, so that from the entrance to the ear the tegmen tympani and mastoid antrum are brought into view and rendered easily accessible to necessary treatment."

The author observed among his cases six in which the necrotic disease had exposed the dura mater of the cerebellum and three in which it had exposed the dura mater of the temporal lobe over the tegmen tympani. In one of the latter cases the disease penetrated the dura and portions of brain-tissue escaped into the middle ear and were syringed out at the meatus. This case got entirely well after surgical exposure of all diseased parts. In another case the cerebellar dura was penetrated by the necrotic disease and portions of cerebellar tissue escaped through the middle ear. In this instance, too, entire recovery ensued after surgical exposure and cleansing of the diseased middle ear and cranial tissues.

"Operative exposure of the middle-ear spaces affords us the important information that the frequent, grave, and far-reaching destructions induced by various middle-ear affections may penetrate to the brain and the sinus, not only without striking symptoms, but even in the midst of those of perfect health; so that it is only when the diseased nidus is exposed by operation that the real danger in which the patient stands is fully known. The more cases of chronic purulent inflammation of the middle ear and also of chole-steatoma of the middle ear that are subjected to this radical operation, the more plainly is the great worth of this operation known. Furthermore, as experience teaches that the operation is usually well borne and is followed by the best effects in the most varied conditions, we may conclude that the operative exposure of the middle-ear cavities is one of the most blessed of otiatric interferences."

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Necrosis of the Petro-mastoid following Chronic Middle-ear Suppura-tion.—LEDERMAN (*The Laryngoscope*, vol. i. No. 1) reports extensive necrosis

of the petro-mastoid bone following chronic suppurative otitis media on the right side in a deaf-mute woman, sixty-two years of age. After the disease had lasted nine months facial paralysis occurred suddenly on the right side. A mastoid operation was indicated and performed at the end of a year of chronic aural suppuration. At this operation, in "clearing out the upper and posterior portion of the antrum and cells the finger encountered the dura mater." After the operation exposing the middle-ear cavities there was improvement for a month, when sudden hemorrhages from the ear, nose, and mouth, preceded by paralysis of the left leg and arm, ended the patient's life. It seemed plain in this case that long and extensive disease had existed within the ear and cranium without much external manifestation. Softening of the lower portion of the right temporo-sphenoidal lobe of the brain was found post mortem, accounting for the paralysis in the leg and arm of the left side.

Pyæmic Infection following Aural Suppuration.—O. Brieger has contributed a most valuable article on this very important subject (*Archives of Otology*, vol. xxv. No. 4).

He shows that otogenous pyæmia may occur under three different forms: 1. Without sinus-phlebitis. 2. With thrombo-phlebitis of the lateral sinus. 3. With thrombosis of the cavernous sinus.

The first-named form is rare and usually appears as a dermato-myositis, without muscle abscesses. It may also appear as an osteophlebitis, without involvement of the lateral sinus (Koerner). In the latter form the metastases are rarely located in the lung, while arterial emboli are observed much more frequently than in sinus-phlebitis.

"Hessler's[1] recent article substantiates Koerner's statement that a large group of cases of otogenous pyæmia, which differ clinically by the absence of all local symptoms of sinus-thrombosis, by the greater benignity of the entire disease-picture, and by the unity of pulmonary metastases with relatively frequent metastatic joint and muscle involvement, indicate a special classification."

This classification is not impaired by the occasional occurrence of pulmonary abscesses, without sinus-phlebitis, as shown by a case reported by Brieger and also by one reported by C. H. Burnett.[2]

Brieger states that "in operations (on the mastoid) undertaken during the early days of the disease the subjective mastoid symptoms were lessened, but the general condition was not only repeatedly uninfluenced, but increased fever and chills were observed. The local course was also more unfavorable and more tedious in cases operated upon before the inflammation had reached its height and pus was demonstrable."

In speaking of pyæmia with thrombo-phlebitis of the lateral sinus, the second class named above, Brieger says that, while the treatment of sinus-phlebitis has improved, no great advance has been made in its diagnosis. "The most weighty indication of its existence, according to the present knowledge, has been the general evidence of pyæmia." The temperature-curve, however, in sinus-phlebitis does not always follow the pyæmic type.

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[1] Archiv f. Ohrenh., Bd. xxxviii.   [2] Transactions American Otological Society, 1883.

This form of pyæmia is often confounded with typhoid fever, malaria, and tuberculosis. Peptone has been found in the urine in this form of pyæmia, disappearing after a successful operation on the sinus. "Among the most important local symptoms of sinus-phlebitis are changes in the background of the eye." Griesinger's symptom—circumscribed, hard infiltration, extending backward from the posterior border of the mastoid—is not considered by Brieger pathognomonic of sinus-thrombosis. Extension of the thrombus to the jugular vein is occasionally directly perceptible, but swelling and sensitiveness along the jugular tract must be taken with caution, as Schwartze has observed these symptoms without coexisting inflammatory change in the vein, the sensitiveness in this region being due to the changes in the lymphplexus near it. Brieger, in common with Hessler, J. Orne Green, Crockett, and others, deems prompt exploratory exposure of the sinus in suspected sinus-phlebitis as entirely justifiable and much more advantageous to the patient than waiting for positive symptoms of the presence of sinus-thrombosis, when it is generally too late to operate with any hope of relief. An exploratory incision may be more advantageous than an exploratory puncture and aspiration of the sinus. Sinus-thrombosis may be cured by clearing out the primary pus-collections in the mastoid and evacuating the pus which bathes the sinus. Mere pulsation of the exposed sinus does not preclude the presence of a thrombus within, as this pulsation is due to the impression made upon its walls by the general pulsation of the cranial vessels.

" Ligation of the jugular is unquestionably justified only when it is locally indicated."   .   .   .   " The systematic application of ligation as an integral part of the operative therapy of sinus-phlebitis is not justified. It is an error in pyæmia without sinus-phlebitis."   .   .   .   " The principal point, in my opinion, in deciding as to whether or not the vein should be ligated, is dependent upon the local findings in the vein itself or at least at the central end of the thrombus." The sole contraindication for the operation, aside from the condition of the heart, Brieger believes to be purulent leptomeningitis, the presence of which is to be demonstrated not only by diffuse meningeal symptoms, which under certain circumstances accompany sinus-thrombosis, but most certainly by spinal (lumbar) puncture.

The third form of otitic pyæmia characterized by thrombosis of the cavernous sinus requires, according to Brieger, a special classification in contraindication to lesions of other cranial sinuses. Koerner has shown that this form of thrombosis is due frequently to the passage of infection from the middle ear by way of the carotid canal to the cavernous sinus. While no one symptom may be considered positively pathognomonic of its existence, the occurrence of œdema about the brow and orbit, exophthalmus, paralysis of the ocular muscles, immobility of the eyeball, œdema of the lids, chemosis of the conjunctiva, and often choked disc on the side of the chronic aural suppuration justify the surgeon in a conclusion that he is confronted with thrombosis of the cavernous sinus.

The only treatment so far successful is prompt exposure of the middle-ear cavities, opening freely the lateral sinus, and permitting judicious hemorrhage, in the hope that the normally forcible blood-current in the sinuses will wash out the thrombus, either at the artificial opening in the lateral sinus or into the general circulation, where, if not infectious, it may be dis-

solved without metastases. Brieger reports one case, a man, aged twenty-two years, in which recovery ensued rapidly after generous opening of the lateral sinus, though all the above-named serious symptoms were present before the operation.

Isolated otitic thrombo-phlebitis of the cavernous sinus has not been successfully treated by the Krause method of exposing it as in intracranial resection of the trigeminus." "The sinus has been repeatedly reached and injured by Krause, Finney, and Czerny in trigeminus resection."

DERMATOLOGY.

UNDER THE CHARGE OF

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A Case of Dermatitis and Periostitis due to the X-rays.—T. C. GILCHRIST (*Johns Hopkins Bulletin*, February, 1897) records the case of a man, aged thirty-two years, who, after he had exposed his right hand, wrist, and lower portion of the forearm for three weeks for four hours daily to the X-rays, noticed that the skin turned red and swollen, without being accompanied by pain. The swelling first occurred on the back of the hand, from the knuckles to the wrist, then active inflammation set in, and he was compelled to discontinue his demonstrations. Three weeks later the hand, wrist, and lower fourth of the forearm gradually became more inflamed and swollen, and the lesions spread to the fingers. There were aching, darting pain up the forearm, and throbbing pain, preventing sleep. Under the use of hot-water applications and the internal administration of bromides the swelling and the other signs of acute inflammation subsided. Three weeks from the beginning the dorsal aspect of the hand was deeply pigmented, being of a dark-brown color, and the epidermis was exfoliating, the skin beneath being dry and of a dull reddish color. Ten days later the skin was stretched and glossy, and there was a distinctly thickened state of the first and second phalanges of all the fingers. The metacarpals were also tender on pressure, and the hair of the back of the hand was scanty. All movements of the hand were painful. Sensation was much impaired before exfoliation of epidermis took place. An excised portion of the skin examined histologically showed the vessels of the corium to be dilated and the pigment-cells of the papillæ to be almost as numerous as are usually found in a section of negro skin. Photographs were at this stage taken of the sound as well as of the affected hand, and revealed a distinct osteoplastic periostitis and probably an ostitis, particularly of the first and second rows

of the phalanges of the index and second fingers, also of the heads of the metacarpal bones of the same fingers, which accounts for the marked pains in the hands and in the joints.

A Case of Dermatitis due to Roentgen's X-rays.—CROCKER (*British Medical Journal*, January 2, 1897) reports a case occurring in a boy, aged sixteen years, who was exposed for one hour, on one occasion only, the Crookes tube being placed five inches from the epigastrium, a flannel shirt intervening between the tube and the skin. The next day the skin was irritated and of a deep red color in the area subjected to the rays from the tube. The redness and irritability increased from day to day, and at the end of a week vesicles appeared. The patch was the size of an open hand, circumscribed, and of a dusky, purplish red. It was sore, but not very sensitive, and there was but little itching. A week later the epidermis peeled off, but the excoriated skin, which existed in places, was very slow to heal.

[An examination of the reported cases of this form of inflammation of the skin goes to show that it occurs only when the exposure is prolonged and when the Crookes tube is placed very near the skin or when the exposure is frequently repeated. In one reported case (King's) the application of picric acid (especially useful in burns) not only gave relief to the burning sensation, but seemed moreover to have a protecting influence.]

Blood-erythema.—DR. HARRISON, of Clifton (*British Journal of Dermatology*, January, 1897, p. 42), calls attention to the peculiar state of the skin in which arterial blood sprinkled upon it causes irritation and sets up an erythema, first described by Shield. The case of a surgeon, who for a great many years was annoyed by the irritation resulting from arterial blood coming in contact with his skin, making him uncomfortable, is cited. It was not altogether a subjective sensation. After washing off the blood a pink stain was left on the skin, which lasted for fifteen minutes or longer. He was also very susceptible to the smell of blood.

Mr. Chappell Fowler was acquainted with a surgeon who suffered from the same irritation. He was asthmatical, of very neurotic temperament, and the smell of blood was loathsome to him. After a case of post-partum hemorrhage he had seen an erythematous rash on the arm where the blood had been projected some hours after carefully washing the part, and there was irritation.

Skin, Hair, and Nail Lesions Produced by the Action of X-rays.—E. E. KING (*Canadian Practitioner*, November, 1896) reports a case in which, after six weeks' exposure of from two to six hours daily of the right side, the right hand began to swell, feet became stiff, and large blisters appeared on the dorsal aspect, which produced great pain. The demonstrations were discontinued, and the hand recovered. Two months later he was again exposed to the rays, this time the left side being placed toward the instrument. In about six weeks swelling of the lips and left cheek occurred, and a few days later the left hand swelled with blebs, ached like a severe sunburn, and the skin was discolored. The finger-nails showed signs of shedding; the eyelids were œdematous and there was conjunctivitis on both sides. About two-thirds

of the side of the face exposed to the rays was affected. Subsequent notes of the case state that the skin of the hands was congested, infiltrated, and unusually smooth, the left being almost entirely devoid of hair. All the nails were in a state of exfoliation. The hair on the left side of the face was to a great extent lost, the eyebrows, moustache, and whiskers being almost gone, the skin in these regions being very smooth and different from that of the other side.

Applications in Seborrhœa Capitis.—HERBERT SKINNER (*British Journal of Dermatology*, February, 1897, p. 70) advocates the following formula for cleansing the scalp in seborrhœa: Sapo. cast. alb., ℨj; alcohol, ℨj; ether methyl, ℨij; aq., ℨiij. Dissolve the soap in the water, add the spirit, clarify by filtration through kaolin, and then add the ether. Various ingredients can be added to this, even mercuric chloride. One of the best methods to cleanse the scalp is with the following shampoo liquid: Ammonii carbonat., ℨss; boracis, ℨj; aqua, Oj. Dissolve and add glycerin, ℨiv; bay rum, Oj.

Quillaia washes, consisting, for example, of two parts of a perfumed spirit or lavender-water and one part of fluid extract of quillaia, are soothing, but possess doubtful cleansing properties. The following is a new formula made with saponine, and is an improvement on most of the preparations of this kind: Saponin, ℈j; tinct. benzoin simpl., ℨj; aq., ℨss; glycerini, ℨj; acid carbolici, ℨj; aq. cologniensis, ad ℨj. Dissolve the saponin in the water and add the other ingredients. An antiseptic and stimulating "hair-tonic," containing no alkali, and therefore having no tendency to bleach the hair, may be compounded as follows: Acid salicylic, gr. xv; resorcinol, ℨss; tinct. cantharidis, ℨss; tinct. capsici, ℨj; saponin, ℨj; lanolin, ℨj; aq. rosæ, ad ℨx. Melt the lanolin, dissolve the saponin in the same quantity of water, and incorporate the two. Dissolve the acid and resorcinol in the tinctures and rose-water respectively. It should be brushed into the scalp once daily.

The following "tonic for the hair" is recommended, having several points to commend it, not the least being the combination of a small percentage of oil with alcohol: Tinct. cantharidis, ℨxiv; tinct. cinchonæ, ℨij; tinct. benzoin. simpl., ℨvj; spirit. lavandulæ, ℨiss; ol. ricini, ℨij; alcohol, ad ℨx. Dissolve the castor oil in the alcohol, mix with the tinctures and spirit, filter through kaolin. For a natural grease for the scalp the following liquid lanolin preparation will be found useful: Lanolin, ℨss; saponin, gr. iv; aq., ℨss; alcohol, ℨj. Dissolve the saponin in the water, stir in with the lanolin, which has been previously melted, and when cooling add the spirit. This makes a thick cream, devoid of stickiness or greasiness, which can be poured out of a bottle.

Treatment of Malignant Syphilis.—ALBERT NEISSER (*British Journal of Dermatology*, January, 1897) defines "malignant syphilis" to be a severe form of the disease characterized by certain symptoms differing rather in their nature than in mere severity from the usual forms of the malady. Every case of severe syphilis must not be included under the designation of "malignant." For example, when syphilis is rendered a dangerous disease on account of the relation of the organs invaded, the term "malignant" is inappropriate, the term "grave" being more suitable. Again, in cases in

which ulceration occurs in the early stages of the "secondary" period the use of the word malignant is incorrect, "abnormal" or "grave" syphilis expressing the condition more accurately. As the result of experience it has been found that subjects suffering from malignant syphilis do not bear mercurial treatment well, great precaution being needed in the administration of the drug. No successful result is to be looked for from "forced cures." In former times the rule was laid down that mercury should never be prescribed in malignant forms of the disease; but Neisser thinks this is an extreme view, although the insoluble salts in the forms of subcutaneous injections (valuable as they are in Neisser's opinion) should never be employed in malignant syphilis. A certain degree of success follows the use of potassium iodide, especially if it is administered when fever is present. In cases in which antisyphilitic treatment, even when persevered in, is ineffective, the only possibility of benefiting the patient is by the use of tonics (arsenic, strychnine, iron, quinine, baths, especially sea-baths) and the external use of sulphur in the form of sulphur ointment or the sulphur-bath. The latter often proves successful. The early employment of mercurial treatment and its administration in large doses have nothing to do with the development of the malignant form of the disease; and the same remark applies to the "long-continued, intermittent" method of treatment. Forced mercurial treatment aggravates this form of the disease. Neisser agrees with Fournier in insisting that the individuality of each case must be borne in mind, and that the pauses between the courses of treatment should be properly observed. Neisser does not regard "antisyphilitic serum" as a valuable remedy, either in malignant or in any other form of syphilis.

Counter-irritation in the Treatment of Herpes.—Theodore Wilkins (Medical Record, September 26, 1896) states that in nearly all cases of herpes zoster a tender spot may be found higher up over the nerve-trunk. At this point he recommends the application of a counter-irritant in the form usually of flying-blisters or turpentine. The pain in most cases is speedily relieved, and the eruption dries up much sooner than would be the case in the natural evolution of the disease.

A Study of the Trichophyton Fungi.—As the result of his investigations Krösing (Archiv für Dermatologie und Syphilis, Bd. xxxv. Heft 1 u. 2) concludes in part as follows: Sabouraud's division of the trichophyton fungi into large and small-spored (megalosporon and microsporon) is unwarranted. The size of the spores varies within wide limits in the same fungus and in the same culture. Accordingly classification of the human trichophytoses according to their localization (trichophytosis of the scalp, of the beard, of the non-hairy parts), based upon the size of the fungus, fails. Only such cultures may be employed for comparison as have been obtained from one spore or one mycelial element. Only such can be regarded as pure cultures in a bacteriological sense. From any one affection only one fungus is to be obtained, which is the cause of the disease.

The attempt to distinguish the trichophyton fungi by microscopical examination of cultures is hopeless, on account of the manifold character of the generation and fructification organs in one and the same culture and on

account of the inconstancy of the same at different times or by a repetition of the culture. On the contrary, a macroscopic comparison of cultures grown under conditions as like as possible is adapted to make this distinction possible. By same conditions is to be understood similarity of nutrient medium, of temperature, the same age, the same amount of moisture in the surrounding air. Variation in any one of these factors changes the appearance of the culture and makes it unsuitable for comparison. The most characteristic, and therefore the best suited for comparison, is the potato-culture.

Deep and superficial affections (sycosis and trichophytia circinata) can be caused by the same fungus. There are forms of suppuration produced by the trichophyton alone. It is thus far impossible to draw conclusions concerning the fungus at the bottom of it from the clinical picture presented by any trichophytosis.

OBSTETRICS.

UNDER THE CHARGE OF

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Undiminished Mortality from Puerperal Fever.—In the *British Medical Journal*, 1897, No. 1888, CULLINGWORTH, in his presidential address before the Obstetrical Society of London, quotes the statistics of the mortality from puerperal septic infection in England and Wales, and notes the fact that the death-rate for 1895 is the same as that for 1864 and also the same as that for 1849. A review of this mortality for the last fifty years shows no appreciable diminution. This extraordinary condition, in view of the claims for successful antisepsis, naturally attracts attention. In the city of London the total mortality of labor has considerably lessened. This is not from a diminished mortality of sepsis, but because the accidents of labor are more successfully dealt with. In the Provinces, however, the death-rate from sepsis has increased, and accounts for more than one-half of the total mortality of parturition. The detailed examination of these statistics is not of more than local interest.

In considering the mortality from puerperal fever in private practice Cullingworth found that while it is almost impossible to obtain accurate returns, there is no reason to believe that this death-rate is as low as that of the best obstetric hospitals; on the contrary, it is undoubtedly much greater. Cullingworth blames this condition upon the careless and indolent use of antiseptics, of which the hurried practitioner is often guilty. He considers it the duty of obstetric teachers and obstetric societies to urge upon the profession the scrupulous practice of antiseptic precautions. As in many districts of England and Wales midwives are commonly employed, their licensing

and the restrictions under which they practise should be made the subject of thorough investigation and protective legislation.

[There is every reason to believe that a similar condition of affairs exists in America. While our lying-in hospitals have the smallest death-rate from sepsis possible under our present knowledge, still among the foreign population in poor circumstances midwives are commonly employed, and septic infection is not infrequent. The practice of criminal abortion is frequently followed by puerperal sepsis. Cases of infection are not uncommonly seen among patients attended by undergraduate students. In some outpatient services cases are given to second- or third-year men who may be attending demonstrations in which pathological specimens or injected cadavers are used. It is not strange that such should infect their patients.—ED.]

The Prevention of Post-partum Hemorrhage —In the *British Medical Journal*, 1897, No. 1888, ATTHILL describes his treatment of several patients who, after previous labors, had suffered from severe post-partum hemorrhage. On one occasion he gave such a patient quinine for neuralgia occurring shortly before labor, and was interested to observe that she had no bleeding after delivery. In several other cases he began at the thirty-fifth week of gestation to give the patient tonic doses of strychnia and ergot. As a result, labor-pains were not especially violent, the labor proceeded smoothly, and no hemorrhage followed. Atthill believes that, to be of any use in puerperal hemorrhage, ergot should be given for several hours before the termination of labor. He concludes that when ergot and strychnia are given previous to the termination of pregnancy in women having a marked tendency to post-partum bleeding that this bleeding is prevented; that when so given in ordinary doses no injurious effect on mother or child is observed, but that the commencement of labor seems somewhat delayed. Such practice makes the involution of the uterus more perfect and hence avoids post-partum disease. Unless the uterus is already acting, this treatment will not bring on premature labor or induce abortion; in cases of threatened abortion ergot and strychnia act as uterine tonics, preventing abortion if the ovum is not blighted; if, however, the ovum be dead, this treatment tends to secure its complete expulsion.

Deflection and Rotation of the Uterus —MILNE MURRAY contributes an interesting paper upon this subject in the *Edinburgh Medical Journal*, February, 1897. After reviewing the literature of this topic, Murray asserts that a reason for the tendency to rotation of the uterus is found in the construction of its muscular wall. He believes that the arrangement of the layers of muscle is such that as the uterus expands the tendency to rotation arises; it is inconceivable that these fibres are so symmetrically arranged that the strain will be symmetrically distributed. As internal pressure increases it produces a change of shape and a change in the distribution of the mass about a vertical axis. Murray observed, in nine cases of labor in which defective rotation of the occiput occurred, that in four of these rotation took place before the application of forceps; in two after the application; while in three the occiput was delivered posteriorly. He concludes from his observation that deviation of the post-partum uterus from the mesial plane is the rule; this

is most frequently to the right side of the body. Rotation of the uterus in a vertical axis during its growth in pregnancy seems a physical necessity of its structure. This rotation possibly offers a mechanical explanation of defective rotation of the occiput. In occipito-posterior rotations the deviation observed is almost invariably to the left, and a numerical coincidence exists between the proportion of cases of posterior rotation of the occiput and left lateral deviation of the uterus.

Puerperal Mortality in Brooklyn.—In the *Brooklyn Medical Journal*, 1897, No. 2, KORTRIGHT contributes a paper upon this subject. He finds that during 1895, 224 women died of puerperal causes in the city of Brooklyn; of these, 76 deaths were due to puerperal sepsis. The largest number of these cases occurred during the winter months—a fact often observed by others. Many of these deaths were among persons employing midwives instead of physicians. The writer concludes from his study that the puerperal death-rate is lower among Americans than among foreigners and their children. Septic infection is more often fatal where midwives are habitually employed. Kidney-failure is most frequently observed among those who use alcoholic drinks.

Ovarian Tumor Obstructing Labor.—In the *Scottish Medical and Surgical Journal*, 1897, No. 2, RIDDELL reports the case of a patient, aged thirty years, who had been confined six months before he saw her, her labor having been complicated by the presence of a pelvic tumor, which was pushed up into the abdomen and the child delivered with forceps. A cystic tumor was found in the right lumbar region, for which abdominal section was performed. The tumor was found to be a dermoid cyst containing fatty material, hair and bone. The patient was found to be pregnant about three months and a half at the time of the operation; the pregnancy, however, was not interrupted, the patient making an uncomplicated recovery.

Sudden Death in Pregnancy and the Puerperal State.—ZWEIFEL reports the following cases from his clinic in Leipzig in the *Centralblatt für Gynäkologie*, 1897, No. 1: The first was that of a multipara who had a rhachitic pelvis and a slow and tedious labor. During this she was taken with a chill and fever, with a discharge from the vagina which resembled pus. Microscopic examination of this showed no streptococci present. As the patient was suffering from bronchitis, chloroform was given and four incisions made in the cervix, and the forceps applied to the head. It was determined to perforate the head if the forceps failed, as the child was probably infected by the uterine discharge. Accordingly, the head was perforated and the child delivered. The patient shortly afterward had a chill, followed by fever. Her lochia was foul for several days, but streptococci were absent. On the third and fourth days vomiting began, with icterus. On the ninth day, as the patient was turning in bed, severe hemorrhage occurred. This was checked by tampon, but returned the next day. Upon the eleventh day, under ether, the uterus was thoroughly examined, but no placental polyp could be found. The urine contained albumin. On the next day the patient was thirsty, seemed fairly comfortable, with a pulse of 112; no hemorrhage. Half an

hour after the morning visit the patient raised herself as if to drink, uttered a loud cry, and suddenly died. The most probable cause of death seemed embolism of the pulmonary arteries. Post-mortem revealed beginning gangrene of the lung from inspired particles of food. An examination of the kidneys revealed subacute nephritis, the cause of death being acute uræmia.

Zweifel has collected a number of cases of sudden death, in some of which embolism of the pulmonary arteries was present; in others, valvular heart-disease; in one, a tumor of the spinal cord; while in another stenosis of the coronary arteries was present.

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Acute Inversion of the Uterus—Abdominal Section—Reduction, followed by Recovery.—BROWN, of Springfield, Mass., reports in the *Boston Medical and Surgical Journal*, 1897, No. 6, the case of a multipara who had sustained inversion of the uterus, caused by pulling upon the umbilical cord in removing the placenta. This was followed by severe bleeding and collapse. When seen, eight days after labor, the patient was anæmic, with severe cough, papular eruption, and fever. An attempt to return the uterus to its former position was made under ether, which failed on account of involution of the cervix, hemorrhage which followed, and the poor condition of the patient. Twenty-four hours later abdominal section was performed, the cervix was dilated, and, after twenty-three minutes' effort, the uterus was returned to its normal position. It was then ventrofixated by a single silk ligature passed through the abdominal wall. The uterus was curetted, irrigated, and packed with gauze. The patient had fever for some days, with rapid pulse, but finally recovered.

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Secondary Abdominal Pregnancy following Rupture of the Uterus in the Fourth Month.—An extraordinary case of abdominal pregnancy is reported by LEOPOLD (*Archiv für Gynäkologie*, 1895, Band lii. Heft 2). The patient had been pregnant eleven times, and during her twelfth pregnancy, at about the fourth month, she fell upon a flight of stairs, striking heavily upon the sacrum, and sustaining a very painful injury. This was followed by no bleeding, nor did inflammation in the pelvis or abdomen develop. As the movements of the child became apparent they were exceedingly painful, the pain radiating through the abdomen. This continued for eighteen weeks after the accident, when fœtal movements ceased and the patient gradually developed chills and fever, with headache and general *malaise*. Neither hemorrhage nor the discharge of decidua was ever observed. About three weeks after the cessation of fœtal movements the patient entered Leopold's clinic. An examination of the abdomen led to a diagnosis of ectopic pregnancy upon the left side, with fully developed fœtus, which had perished three weeks previously and which lay transversely across the abdomen. The patient was subjected to abdominal section, when the child was found lying among the intestines in the abdominal cavity. The upper border of its containing sac was formed by the transverse colon. After the removal of the child and its membranes and fluids the cord was traced through the broad ligament of the left side through a tear three-fourths of an inch long in the uterine muscle to the left of the womb. The broad ligaments were ligated and the uterus was amputated, the stump being fastened to the lower end of

the abdominal incision and bleeding prevented by an elastic ligature. The placenta was found to have been attached to the anterior uterine wall. Although the patient lost but little blood during the operation, she was almost pulseless at its close. Drainage with iodoform-gauze was employed, and after the removal of this gauze and the elastic ligature an abscess developed in the abdominal wall, on the right side of the stump. This was drained, and the patient made a good recovery.

An examination of the fœtus showed that it was at term and fairly developed. Thorough study of the specimen showed that at the time when the patient fell the uterus, which was thin-walled, had ruptured, and the impregnated ovum had escaped at the point of rupture into the abdominal cavity. It had there developed, while the placenta remained within the uterus. No treatment except operation could have successfully dealt with the case.

The Intrauterine Use of Elastic Bags in the Induction of Labor.— STIEDA (*Monatsschrift für Geburtshülfe und Gynäkologie*, 1897, Band v. Heft 3) contributes an interesting paper upon the employment of elastic bags in inducing labor or abortion. He distinguishes two methods, in one of which the bag is placed within the cervix, while in the other it is carried above the internal os into the lower uterine segment. In connection with this treatment he employed frequent hot douches to soften the parts and promote dilatation. He describes in detail five cases in which labor was induced in this manner. In all, a living child was born, while the length of the induced labor varied from nine to twenty-four hours, the average being fifteen hours. In the case of several of these patients this was a much shorter labor than had occurred previously. In some cases it was necessary to use specula in introducing the bag, but in the most this was not found essential. Where it was desired to hurry labor traction was made upon the supply-tube through which the bag was filled, and the distended bag was slowly drawn through the cervix; where haste was not desired the bag was allowed to remain until expelled. The precaution was taken to force air out of the bag before its introduction and to fill it with sterile water.

In addition to the induced labors, Stieda narrates three cases in which he induced abortion by the same method. This was equally successful, the abortion being concluded in about seven hours, the use of the bag being necessary for between one and two hours. In cases where traction was made upon the bag the pelvis of the patient was raised so that the traction was exercised downward and backward in the axis of the pelvis.

The same method was employed successfully in a case of submucous myoma of the uterus in which the patient declined operation and in which the cervix was dilated, tenaculum forceps applied to the tumor and traction made upon these forceps for twelve hours. At the end of this time it was possible to remove the tumor by enucleation.

Central Laceration of the Perineum during Labor.—In the *Annali di Ostetricia e Ginecologia*, January, 1897, LAMBERTENGHI reports the case of a young woman, aged seventeen years, who, during spontaneous labor, sustained a central laceration of the perineum. The *fourchette* was left entirely

intact, laceration extending from just below the posterior commissure to the tissue just above the anus. There was nothing abnormal about the child nor about the labor, except that at the last the patient had strong pains. The laceration was immediately closed with silk suture, and although union by first intention was not obtained perfectly, still the parts granulated well and the patient left the Maternity in good condition.

A tabulated report of ninety-one cases of this abnormality is appended and various conclusions are drawn from this table. As regards the causation, some writers have sought it in an exaggerated curve of the sacrum; in an abnormal shape of the sacrum; in undue rigidity of the sacro-iliac joints; in a very long and high pubes; in retrocession of the pubic arch; and in abnormal approximation of the ischia. Others have thought that a very long perineum or an abnormally closed condition of the vulva was a potent factor. Some assert that irregular uterine contractions, which destroy the normal dilatation of the birth-canal, are an important factor. As regards the prevention of this accident, insertion of the fingers into the rectum and pressing the head strongly upward have been found efficient by some observers. Others modify the force of uterine contractions by the use of an anæsthetic. Episiotomy and the use of forceps have been successful in some hands. In the ninety-one cases quoted but one death occurred, and this indirectly the result of accident. Under antiseptic precautions and with immediate suture the prognosis for recovery is excellent.

The Management of Twin Labors.—In the *Scottish Medical and Surgical Journal*, 1897, Nos. 1 and 3, STEPHENSON, of Aberdeen, discusses the management of labor in twin pregnancies. He reviews the different beliefs which have been held as to the immediate necessity for interference so soon as the first twin is born. He concludes that multiple pregnancy is abnormal, and hence more dangerous than usual labor. He believes that different principles should govern these cases from those which experience has recommended in the treatment of single pregnancies. He would consider the delivery incomplete when the first child was born and the second had not been expelled. With regard to the second twin, the risks are much greater than in single pregnancy for both mother and child, and hence interference must be practised.

As regards infant mortality in twin labors, it is on the average two and one-half times greater than in single births; inasmuch as twins are usually smaller than the average child and their expulsion more easy, there must be other reasons which bring about the increased mortality. When the element of time is considered, it is found that three-fourths of the cases end within the first half-hour without material assistance; one in every four, however, requires artificial aid. The mortality of the second half-hour after the birth of the first child was four times greater than that of the first half-hour. If the duration of labor be prolonged a half-hour, the life of the second child is greatly imperilled. It is found that in the first-born of twins, if the head presents, the mortality is greater than in single births; but if the breech or foot presents, the conditions are much more favorable. In the second-born of twins the mortality in head presentations is almost double. In the cases

collected, where the second child was either transverse or in footling presentation, not a single one of these children was lost. To sum up the mortality by presentations, $90\frac{5}{10}$ per cent. of children lost were in head presentations; $9\frac{5}{10}$ per cent. in breech; while there was no mortality in transverse and footling births. The practical conclusion of these studies lies in the fact that so soon as the first child is born the second should be immediately extracted by the feet. In this way the mortality for mothers and children will be rendered as little as possible.

PÆDIATRICS.

UNDER THE CHARGE OF

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Cystitis due to the Colon Bacillus in Children.—TRUMPP (*Münchener medicinische Wochenschrift*, 1896, xliii. S. 1008) has studied in the clinic of Escherich a form of cystitis in children due to the colon bacillus. This presents itself under two forms: one a primitive form, and the other secondary, consecutive to a follicular enteritis. The primitive form is either slight (characterized by absence of general phenomena, by slight local symptoms, and by rapid and often spontaneous cure), or grave (with severe general and local symptoms, long duration, possibility of ascending infection, and resistance to treatment). The secondary form, which in common with the primitive has the purulent appearance of the urine and shows the presence of the colon bacillus in pure culture, is characterized by absence of all subjective signs of cystitis. In both forms the disease has been observed principally in girls. As to the pathogeny, Trumpp admits either the direct passage of the bacilli through the walls of the rectum and bladder, or the invasion of the bladder by way of the urethra, especially in girls, in whom the vulva is likely to become soiled by fecal matter.

In the milder form the color of the urine is generally normal, the odor stale or somewhat fetid, reaction acid, and a trace of albumin is usually present, due to the pus. Examination of the sediment shows bladder epithelium, polynuclear leucocytes, and short rod-bacilli, single or in small groups outside of the cells.

In the severe form the general health is involved, many cases showing fever of peculiar intermittent type, with anorexia, thirst, vomiting, and rapid loss of weight. Tenesmus is marked, and micturition usually frequent and painful, with tenderness over the bladder and sometimes over the

kidneys. The urine is more turbid than in the milder cases, and the odor is more fetid. Pus is present in large quantity. By extension upward from the bladder, ureteritis, pyelitis, and nephritis may follow. Of 17 cases of children suffering from intestinal diseases, 14 showed the presence of colon bacilli in the urine; 5 of these were boys and 9 girls. In none of these were symptoms referable to the bladder observed.

The treatment consisted of irrigation of the bladder with a lukewarm solution of lysol ($\frac{1}{2}$ per cent.); internally, salol was given in doses of 3 to $7\frac{1}{2}$ grains three times daily.

Presence of Diphtheria Antitoxins in Human Milk. — Schmid and Pflanz (*Wiener klinische Wochenschrift*, 1896, No. 42) report some interesting experiments upon guinea-pigs by injection of both serum from the placental blood of a human female, taken at the time of delivery, and of milk. The animals then received an injection of the ordinarily fatal dose of diphtheria toxin. The results of these experiments showed (1) that antitoxic substances found in the blood of parturient women exist also in the milk; (2) that the quantity of antitoxic substances excreted with the milk is much less than that found in the blood; and (3) that to exert an antitoxic effect equal to that of the blood the milk should be injected in quantity several times greater than that of the blood required.

Peritonitis due to the Pneumococcus in Childhood. — Following up an earlier study on this subject, Brun (*La Presse Médicale*, February 27, 1897) records three new observations which go to prove his earlier claim that in childhood peritonitis due to the pneumococcus presents characteristics and a course which usually permit its distinction from peritonitis due to other causes. His conclusion, he finds, is also supported by an analysis of the cases reported by other observers. Taking account only of cases occurring below the age of fifteen years, in which the diagnosis was confirmed by bacteriological examination, he has tabulated 14 cases, from which he makes some interesting deductions. First, it seems evident that this form of peritoneal infection is much more frequent in girls than boys (11 out of 14 cases). This difference is worthy of comment, for if one is to believe the conclusions of Cassaët, who has recently contributed an important memoir on this form of peritonitis, such a predominance in favor of the female is not observed in adult cases.

This frequency of pneumococcic peritonitis in girls is also interesting, as it serves in a measure to explain the mode of inoculation of the peritoneum. As Boulay has observed the presence of the diplococcus lanceolatus in the cavity and the walls of the uterus, it is competent to ask if pneumococcic peritonitis does not present the same mode of infection as many of the other forms—that is, by passage of the pathogenic organism from the uterus to the peritoneal cavity by the lymphatics or by the tubes. Whatever be the hypothesis, the fact remains, however, that in all the cases in which the localization of the lesion has been clearly shown, this has been always found to be in the lower portion of the cavity—in the iliac fossa or the true pelvis.

Clinically, this variety appears as an encysted sub-umbilical peritonitis.

It begins, as other acute forms, with violent pain in the belly, fever, vomiting, and diarrhœa; but, after a short time, this severity subsides, and tumefaction above the pubis and in the iliac fossa appears, at times distinctly fluctuating. This localization of the lesion, in itself significant, acquires a value almost pathognomonic when accompanied by pouting or fistulization of the umbilicus.

The prognosis seems not so grave as in other forms of purulent peritonitis. Of the 14 cases collected 3 died and 11 recovered, one without intervention after spontaneous opening at the umbilicus and through the vagina, the others after cœliotomy. Resort to operation is recommended in all such cases.

Ecchymotic Measles.— ALBERT ROUGER (" De la Rougeole ecchymotique," *Thèse de Paris*, 1896) devotes his thesis to this subject, which he describes as one of the forms of hemorrhagic measles, which must, however, be carefully distinguished from a true hemorrhagic measles, in which the cutaneous ecchymoses are accompanied by visceral hemorrhages and grave constitutional symptoms; and from infectious purpuric erythemas due to secondary infections from mouth, pharynx, or bronchi, and coming on in the course of or following measles.

All causes which can provoke an obstruction of the local or general cutaneous circulation may produce an ecchymotic form of morbillous eruption. Diseases of the larynx associated with dyspnœa, and especially whooping-cough, may be mentioned as the chief of these.

The exanthem is composed of elements taking the place and the dimensions of the morbillous eruption, at first the color of lees of wine, then changing to violet, to dirty brown, and finally to coppery yellow, not disappearing under pressure, and lasting for from ten to fifteen days. It appears from the second to the fourth day of the morbillous eruption and coincides often with a fall of temperature and an amelioration of the general condition. The prognosis is favorable, except in the cases where the formation of ecchymosis is due to the presence of a grave dyspnœic disease of the lung or the larynx.

Widal's Reaction with the Blood-serum of a Newborn Infant — MOSSÉ (*Le Progrès Médical*, March 13, 1897, p. 170) reported to the *Société médicale des Hôpitaux*, at a recent meeting, that he had obtained this reaction in a woman suffering from a mild typhoid fever at the sixth month of gestation. At the time of delivery the reaction was obtained from the serum of the milk, of the placental blood, and of the blood of the newborn infant.

A similar case was reported at a recent meeting of the Philadelphia Pædiatric Society by its President, Dr. J. P. Crozer Griffith. The infant was born during the convalescence of its mother from a rather mild attack of typhoid. The test with serum from the infant's blood was quite conclusive.

The Presence of Diphtheria Bacilli in the Throats of Children in Hospitals.—MULLER (*Jahrbuch f. Kinderheilkunde*, Bd. xliii. S. 54) records a series of observations upon this point extending over a period of five months,

carried out systematically with all the patients admitted to one of Heubner's wards. Of 100 children thus examined, none of whom presented clinical evidence of angina or stomatitis, 24 were found who yielded diphtheria bacilli in cultures of their buccal secretions, four of this number being already patients in the ward at the time examinations were begun. Of the remaining 20 cases, 6 entered the hospital harboring bacilli in their throats, and the remaining 14, though free from the bacilli at admission, were found to have become infected after several days to several weeks of residence. The transmission of the bacilli from a child in one bed to one in a neighboring bed could often be observed.

None of these children who had bacilli in their throats presented any local or general symptoms of diphtheria, and often the germs remained demonstrable for weeks and even months (two and a half months in one case), without further evidence of their presence, though in several of these cases the bacilli were very virulent.

Of the six children who brought bacilli into the hospital, only one had a history of exposure, he coming from a family where five weeks before there had been several cases of the disease. Two came from the measles pavilion, and the remaining three had never knowingly been in contact with children suffering from the disease.

In twelve cases the bacteriological examination was completed by inoculation-tests. In six cases the bacilli were found to be extremely virulent and caused death of the injected animals in from twenty-four to forty-eight hours ; in the six other cases the virulence was of moderate degree.

A Case of Creolin-poisoning in a Child.—ANTHONY (*Medical Record*, March 27, 1897) relates a case of acute poisoning with this drug occurring in his own child, aged five years. The boy was suffering from whooping-cough, for which inhalations of creolin were being used. By mistake the nurse gave him a teaspoonful of creolin, thinking it was a cough-mixture. The mistake was immediately recognized, and the child suffered great agony, the lips and chin becoming white. The father reached him about ten minutes after the ingestion of the drug, to find him comatose, with greatly contracted pupils, cold skin, and complete muscular relaxation. Respiration was superficial, jerky, and irregular ; the pulse rapid, faint, irregular, and at times very indistinct. The general condition suggested the use of atropine, and $\frac{1}{100}$ grain was given hypodermatically, followed in thirty minutes by a second dose of $\frac{1}{50}$ grain, artificial respiration being kept up in the meantime. Shortly after the second dose of atropine the pupils began to dilate and the heart's action improved. In two hours consciousness was sufficiently restored to permit liquids to be swallowed, and then sulphate of magnesium in saturated solution was given until four drachms of the salt had been taken. Six hours after ingestion of the creolin one ounce of black urine was passed. This, on standing, deposited a black granular sediment resembling charcoal. Recovery was rapid, and no unpleasant sequelæ remained except from temporary constitutional disturbance due to the atropine, and the local corrosive effects of the poison upon the lips, mouth, and throat. The value of atropine and the sulphates thus seems clearly indicated in the treatment of cases of poisoning by creolin.

GYNECOLOGY.

Atrophy of the Uterus following Castration.—GOTTSCHALK (*Archiv für Gynäkologie*, Band liii. Heft 2) concludes that the atrophic changes seen in the uterus after the normal or artificial climacteric are due neither to the diminished blood-supply, nor to nerve-degeneration, as shown by experiments in animals. So long as healthy ovarian tissue is preserved the spermatic vessels on both sides may be ligated without causing atrophy of the uterus. In other words, while ovulation persists this change is absent. The normal size and consistence of the organ are due to periodical vasomotor paralysis. When ovulation ceases, normally or artificially, this periodical increase in the blood-supply does not occur, the vessels lose their tone, and general atrophy results.

The writer further states that after removal of the adnexa for disease due to gonorrhœal infection the endometrium in the specimens examined by him, as well as the mucosa lining the stumps of the tubes, showed no evidence of such disease. This is opposed to the view of those who advise extirpation of the uterus in these cases. Even when a profuse uterine discharge persisted after castration, it contained no specific micro-organisms.

Hemorrhages at the Climacteric.—REINICKE (*Ibid.*) states that climacteric hemorrhages are due to arterial sclerosis, in consequence of which the vessels lose their muscular tone and are unable to contract, as they do normally at the time of the menstrual flow; hence the menorrhagia which is so common at the menopause. When the hemorrhages persist in spite of repeated curettement and the administration of ergot (especially if the drug increases the flow), it is safe to infer that these vascular changes are present, especially if the absence of endometritis, neoplasms, and disease of the adnexa can be excluded. This diagnosis is confirmed if the uterine body is hard and arterial changes are noted in the extremities.

Since these hemorrhages are due to sclerosis of the uterine arteries, no effect can be expected from the use of drugs or electricity—in fact, they are usually aggravated by ergot, which is apt to cause venous congestion rather than arterial anæmia. Rest, strict regulation of diet, with the avoidance of alcohol, strong tea and coffee, and the use of laxatives are sufficient in mild cases. Curettement has been advised, but this operation simply opens up the mouths of numerous vessels which are unable to contract, and thus increases the flow. The cause of the hemorrhage is not in the mucosa, but in the muscular substance of the uterus. Dilatation of the cervical canal and intrauterine applications of Monsell's solution are preferable. In obstinate cases in which the patient is really in danger from repeated hemorrhages total extirpation

is indicated, the results being quite satisfactory, while the mortality is only a little over one per cent. Castration is not a sure means of relief. This radical treatment should be adopted earlier in the case of workingwomen who cannot rest during the flow.

The Anatomy of the Ovaries in Osteomalacia.—HEYSE (*Ibid.*), from a careful microscopical study of ovaries removed from osteomalacic women, decides that there is no reason to infer that there is a marked decrease in the number of primordial follicles. This is also proved by the well-known fertility of these subjects. He believes that the ovarian nerves play an important part in the process and that future investigations will disclose pathological changes in them ; but whether these changes are primary or secondary is not clear. Unfortunately, ovaries have not been examined in an early stage of the disease.

Treatment of Sterility.—LEVY (*Frauenarzt*, 1896, No. 11), in a judicious article on this subject, calls attention to the tendency of both physician and patient to ascribe the cure of sterility to some particular method of treatment, either operative or non-operative. He insists upon the necessity of examining the husband's semen before beginning any course of treatment, even when some obvious pathological condition is found in the wife. The importance of the psychical factor must never be lost sight of. The assurance given to the patient that she is capable of conceiving may in itself serve to reconcile certain domestic obstacles. In any case the principle *nil nocere* should always be borne in mind, for in performing an operation for the cure of sterility the surgeon may substitute a pathological for a normal condition.

Significance of Pelvic Pain.—DOLÉRIS and PICHEVIN (*La Gynécologie*, 1896, No. 6) conclude an article on this subject with practical deductions concerning the clinical significance of various pains referred to the pelvis. In acute metritis the pain is deep-seated, diffuse, and radiates toward the loins, hips, and hypogastrium. It is principally intrapelvic and is accompanied by vesical and rectal tenesmus. It is most severe in acute endometritis, being least in the puerperal form. The pain, however, is only agonizing when the adnexa, peritoneum, or parametrium are inflamed. Chronic metritis is characterized by attacks of uterine colic, mostly confined to the menstrual period. In these cases traction on the cervix gives rise to lumbar pains due to stretching of the sacro-uterine ligaments.

The pains in retroversion are of several different types. If complicated by adhesions and disease of the adnexa the pain is characteristic of these conditions. When retro-uterine exudates are present the pain is less severe, except when attempts at replacement are made. It usually radiates toward the rectum, and is often accompanied by severe tenesmus, especially during defecation ; this is quite pathognomonic. In simple retroversion the pain may be in the uterus, at the base of the broad ligaments, and in the neighboring organs. The posterior surface of the organ at the fundus is the seat of greatest tenderness, which is to be distinguished by palpation from that caused by pressure of a prolapsed ovary or tube. Lumbar and inguinal pains are often present due to traction on the sacro-uterine and round ligaments.

The characteristic pain in prolapsus uteri is lumbo-sacral, from traction on the sacro-uterine ligaments, to which is often added painful sensations in the flanks due to dragging on the broad ligaments, and also in the epigastrium from ptosis of the abdominal viscera. Vesical tenesmus is more constant than in retroversion; but rectal tenesmus, on the contrary, is absent.

Cancer of the corpus uteri is often painless until the perimetric tissues have been invaded. Attacks of uterine colic are characteristic of corporeal, as contrasted with cervical malignant disease.

Rapidly growing fibroids are attended with more pain than are those which develop slowly. Cystic degeneration increases the pain, which is also most marked in connection with multiple growths within the muscular wall of the uterus. The pains are aggravated by the menopause and often disappear temporarily or permanently after the climacteric. Complications —disease of the adnexa, adhesions, etc.—aggravate the distressing symptoms. The painful sensations due to pressure are readily explained.

Cirrhotic ovaries are most painful, especially when adherent. Attention has often been called to the inter-menstrual pain caused by this condition. When both ovaries are diseased, the pain often alternates, being on one side at one month, and on the opposite side the following month. The pain in chronic salpingitis is twofold, and is due, first, to traction on the nerves within the tube; and, secondly, to distention of the tubal wall, especially during menstruation. The mere presence of adhesions is not sufficient to explain the pain in these cases; the occurrence of an actual infective inflammation is necessary. Pain due to tubal disease is aggravated at the menstrual periods, but the inter-menstrual pain noted in ovarian trouble is absent.

The pain in salpingo-oöphoritis is referred to the lower abdomen and to the affected side, being deep-seated and increased by direct palpation. It is usually paroxysmal and lancinating during exacerbations, dull and heavy during the interval between acute attacks. It is often entirely out of proportion to the extent of the lesions; the amount of displacement of the affected organs rather than the size of the inflammatory mass seems to govern the severity of the pain.

[This ingenious attempt to refer certain distinct pelvic pains to recognized pathological conditions shows keen observation and analysis. Practically, there are so many exceptions to the rules laid down by the writers that they must be regarded as suggestive rather than positive. The paper is, however, worthy of careful reading, though somewhat prolix.—H. C. C.]

New Operation for Retro-displacement.—GODINHO (*Ibid.*) describes the following operation for the cure of retroflexion with fixation. The vesico-uterine pouch is opened by a transverse incision, after detaching the bladder from the cervix; two fingers are introduced, adhesions are separated, and the uterus is replaced bimanually. A silk suture is then passed through one of the round ligaments near its base, is tied, and is then passed through the same ligament three inches below the former point. The same procedure is carried out on the opposite side. The sutures are then tied, thus shortening the ligaments, and with the same needles the resulting loop is sewed together on either side. The wound is then closed. If the uterus is prolapsed, Freund's operation can be performed at the same sitting.

The results obtained by the author were entirely satisfactory. The operation is not only simple, but is applicable to cases of complicated as well as simple retroversion. Diseased adnexa can be removed at the same time. The uterus is movable, pregnancy is not interfered with, and there is no visible and painful scar. Wertheim has suggested a similar procedure, supplemented by shortening of the sacro-uterine ligaments, which seems to the writer to be unnecessary.

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Benign Changes in the Endometrium.—(*Zeitschrift für Geb. und Gyn.*, Band xxxiii. 2). From microscopical examination of the endometrium in 115 cases PINKUSS found glandular changes in 24 and interstitial in 91. In the former the inflammation is not primary in the glands, but is due to circulatory disturbances caused by masturbation, undue sexual irritation (incomplete coitus), and ovarian causes. Interstitial endometritis, on the other hand, is always due to previous infection. It is characterized by hemorrhage and purulent discharge. The glandular form gives rise to dysmenorrhœa and menorrhagia, the latter being prolonged rather than profuse. Abundant atypical hemorrhages are present in cases of atrophy of the mucosa.

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Prolapse of the Uterus in Young Girls.—STEPKOWSKI (*Gaz. lek in Przegl. Chirurg.; La Gynécologie*, 1897, No. 1) reports the case of a young woman, aged twenty-five years, who had suffered for twelve years from frequent attacks of vomiting. Since the age of fourteen she had engaged in hard manual labor. Menstruation began at seventeen, but several months before this time she had prolapsus. At the age of twenty the uterus and vagina were entirely outside of the body. The pelvis was markedly contracted, and the patient had pulmonary tuberculosis. The displacement was attributed by the writer to the poor constitution of the patient, the arrest of development of the uterine ligaments, and increased abdominal pressure due to frequent attacks of vomiting and the carrying of heavy weights.

KARCZEWSKI (*Ibid.*) cites the case of a girl, aged thirteen years, who had complete procidentia of gradual development, due to carrying heavy burdens. Five days before entering the hospital the rectum also prolapsed.

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Obstinate Cystitis in the Female.—ESCAT (*Annales des Mal. des Organes Génito-urinaire*, 1897, No. 2) concludes a lengthy paper on this subject as follows: 1. In cases of cystitis resisting ordinary treatment a careful examination should be made of the pelvic organs to determine if there is not some extra-vesical cause for the symptoms. The urethra and kidneys should also receive due attention. 2. After exhausting the usual local methods of treatment (drainage, irrigation, curettage, etc.), epicystotomy should be performed if there are no renal complications. Through the incision the ureters can be catheterized directly, and any diseased portions of the mucosa can be reached with the curette or thermo-cautery. 3. Vaginal cystotomy is preferable in cases of accompanying renal trouble, or when the patient's general condition is bad. 4. A still more thorough plan of surgical treatment is to follow the epicystotomy and cauterization immediately with a vaginal cystotomy, thus securing perfect drainage.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

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AND

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The Plague in Bombay.—In my last report I remarked on the connection between overcrowding, filth, etc., and the prevalence of the plague, calling attention to the comparative immunity enjoyed by the Europeans and the natives of India resident in Hong-Kong, where the disease was practically confined to the Chinese quarter, even Chinamen living in the houses of Europeans or under like conditions escaping infection; and among those attacked the case-mortality of Europeans and Indians was conspicuously lower than that among the Chinese. I also referred to the contrast presented by the almost ideal perfection of the sanitary conditions of the British quarters of Hong-Kong, in which too our Indian brethren reside, and the filthy habits and surroundings of the Chinese population; and between the former and those of Bombay, the insanitary conditions of which fully accounted for the severity of the plague in that city, though it was not endemic in India, as is the cholera, and rarely obtained a footing in other parts of the country save in years of famine.

I will now give a fuller description of the sanitary defects of Bombay, the present state of which is a disgrace to our otherwise able and beneficent administration, and is in some respects as bad in the quarters inhabited by the Europeans and wealthy natives as in the poorest. The sewers are laid with so small a gradient that they are not self-cleansing, and from insufficient pumping are in part choked with deposits, while at high tides and during heavy rains the sewage rises in the manholes and even into the basements of the houses. Pipe-drains are not laid in concrete, even where the soil is water-logged or composed of made ground, and are consequently liable to sinkage and dislocation at the joints. The foreshores are offensive in the extreme, and the flats on the outskirts of the city present pools of stagnant sewage and heaps of refuse which might have been utilized for reclaiming the salt-marshes at Coorlea, as was formerly begun with marked success.

The native quarter of the city is largely built on made soil, much of it composed of refuse, and is unsewered or drained except by surface-drains or gutters, which carry off so much of the storm-waters and liquid sewage as is not absorbed by the soil, while the solid excrement and refuse are removed in baskets by the sweepers, to be carted away and emptied into one of the main sewers or deposited on the flats. The want of public latrines leads to the use of waste ground and open spaces by the natives employed at the docks and other outdoor labor. The greater part of the poorer classes are

housed in jerry-built "chawls" or many-storied blocks of back-to-back tene-
ments, dark and ill ventilated; while the excessive rents charged lead to
overcrowding among the poor and compel the middle classes to live at places
along the lines of railways to many miles in the country around. Even
Malabar Hill, where the wealthier families, both European and native, reside,
is undrained, and the "compounds" or enclosures around the larger houses
are often overcrowded with the cottages of the servants and their families,
while here are the "towers of silence," where the Parsees, who form the
richest and most influential section of the mercantile class, expose their
dead to be devoured by vultures and other birds of prey, while the Moham-
medan cemeteries occupy large areas within the precincts of the city.

The natives are naturally cleanly enough in their persons, but the results
of an unlimited supply of water in a low-lying town, with a water-logged soil
and with a system of sewers either radically bad or in large districts alto-
gether absent, have been disastrous.

The root of all the evil is to be found in the municipal administration.
Some years ago, when the sanitary department was being reorganized, the
local authorities wished to be relieved of their sanitary commissioner; but
the Indian Government refusing to accede to this request, they have system-
atically ignored his recommendations, expunged unpleasant passages from his
reports, and prohibited the last two incumbents of the office from discussing
measures of sanitary reform. His reports are reviewed by a junior secretary,
who passes judgment on matters of which he is profoundly ignorant.

Some years ago Mr. Baldwin Latham, the eminent English sanitary
engineer, at the invitation of the municipal authority, reported on the
sanitary conditions of the city and drew up a scheme for a new system of
sewerage. Not only have his recommendations been ignored, but the very
suggestions that he most strongly deprecated have been carried out.

The Indian Government is supposed to be advised by its Sanitary Board,
but sewerage schemes and the like are everywhere drawn up by the engineers
of the Public Works Department, who, however competent for the construc-
tion of railways, etc., have no special knowledge of sanitary engineering; a
system which entails delay, excessive expenditure, and failure to secure the
intended results.—[E. F. W.]

Concerning Antitoxins.—The insusceptibility of most animals to the more
characteristic and important of human specific diseases had been looked on
by bacteriologists as a stumbling-block, precluding altogether the majority
of experimental researches; and the Jennerian operation seemed likely to
remain the sole example of the prophylactic modification of a human dis-
ease by its transmission through the system of an animal only partially
susceptible; while Pasteur's artificial attenuations *in vitro* of cultures of
pathogenic microbes were, from the impossibility of standardizing their
virulence, no less unsatisfactory than the inoculations of the last century;
to say nothing of the utter futility of efforts at stamping out a disease by
means which involved the maintenance of a succession of cases, however
mild.

But the discovery of Behring that, while the symptoms of diphtheria were
due to the circulation in the system of a poison or toxin formed by the

action of the bacilli in the fluids of the body, resistance or recovery was brought about by means of an antidote or antitoxin produced by the protoplasm of the cells stimulated thereto by the action of the toxin, showed that not only were degrees of resistance dependent on the ability of the individual to generate antitoxin, but that the so-called insusceptibility of the horse to diphtheria consists in his possession of this power to such an extraordinary extent as to enable him to defy infection by even the most virulent and highly concentrated toxins; and that some share of this resistance could be imparted to man by the injection of a sufficiency of the serum of an immunized horse, either before or after infection, thus anticipating or assisting the patient's efforts at withstanding the effects of the poison. Indeed, MEADE BOLTON (*Journal of Exp. Medicine*, i. 3) states that twelve healthy horses were found to yield antitoxin in appreciable amount before having been subjected to the immunizing process; a natural immunity in animals specially capable of artificial immunization being probably an antecedent condition of the latter; and to a like condition, perhaps, some persons may owe their apparent insusceptibility to the infection of certain diseases. As to the permanent immunity to reinfection conferred by one attack of smallpox, scarlatina, and other diseases, we have as yet much to learn. It would seem as if the individual acquired the power henceforth of forming the antitoxin without the necessity of repeated stimulation by doses of the toxin necessary in the case of those which, like diphtheria, may recur, and after which the production of antitoxin gradually ceases; at any rate, it is certain that in the latter class reinfection is rare until after a certain lapse of time, and that in the former it is not unknown after many months or even years.

But from the present state of our knowledge we may safely conclude that (1) when the natural disease confers a permanent or long immunity we may hope to obtain the same protection by attenuated cultures or modified virus; and that (2) whenever the natural disease, though liable to recur—that is to say, not conferring any lasting immunity—tends to spontaneous extinction at the end of a definite period of days or weeks, we may obtain a temporary immunity against infection, or, if that have occurred, may anticipate the natural termination of the disease by injections of the antitoxins or alexins with which, at a later stage, the organism would have attempted, with or without success, to combat the action of the microbes or of their products; such antitoxins being best obtained from the serum of highly immunized animals of species naturally little susceptible to infection with the disease in question, but in default of such, that of persons recently recovered or convalescent from an attack might, there is reason to believe, be available for the purpose, although the antitoxin therein would be present in a far feebler or less concentrated form. WEISBECKER (*Zeitsch. f. klin. Med.*, xxx. p. 312) used with apparently good results in the case of four children, aged from nine months to five and a half years, suffering from a severe attack of measles complicated with pneumonia, injections of 10 c. c. of serum obtained from another strong child just recovering, the brother from whom they had contracted the disease. Such a procedure would be well worth trying in yellow fever, recovery from so fatal a disease implying the production of much active antitoxin.

These considerations, in the new light thrown on the meaning of insus-

ceptibility in animals to certain specific diseases of man, point to the possibility of a great extension of the therapeutics of antitoxins, and open out a vast field for research.

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Immunization against Diphtheria.—There are circumstances under which the prophylactic use of diphtheria antitoxin may be even more valuable than its therapeutic employment, as in schools, etc. LÖHR (*Jahr. f. Kinderheilk.,* Sept. 1896, xliii. H. 1), on an outbreak of diphtheria occurring in a children's hospital, immunized 460, arresting the epidemic, none being attacked within three weeks of the injections, though a very few were at a later period, showing the temporary character of the immunity in a disease that does not naturally confer permanent insusceptibility to reinfection. Of ninety-nine cases of measles immunized on account of the special danger in the event of the supervention of diphtheria, post-morbillary diphtheria being far more fatal than post-scarlatinal, all escaped.

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Poisonous Sausages.—VAN ERMENGEN (*Rev. d'Hyg.,* 1896, pp. 761–819) reports a case in which several persons had been attacked with illness after partaking of sausages which looked so good that the expert and his assistants to whom the rest were sent for examination ate them, with like results, the principal himself dying on the sixth day with gastro-enteritis, acute parenchymatous nephritis, and fatty degeneration of the liver. In these organs Gaertner's *bacillus enteritidis,* which Van Ermengen had found in these sausages, as well as in others that had caused poisoning, was present in large numbers.

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Poisonous Milk.—A. LÜBBERT (*Z. f. Hyg. u. Inf.,* xxii. 1), studying the bacteria first observed by Flügge, which peptonize milk, found that such milk, kept for twenty-four hours at a temperature of 37° C., was poisonous and even fatal to young animals through the formation of toxins, since no bacilli were found in their stomachs. Dr. Lauder Brunton has treated of the poisons formed in peptic digestion. These observations of Lübbert's suggest the expediency of freshly peptonizing milk for each meal, instead of preparing enough for a day's consumption and attempting to arrest the further peptonization by boiling or keeping it in ice.

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CONTENTS.

ORIGINAL COMMUNICATIONS.

REVIEWS.

PROGRESS OF MEDICAL SCIENCE.

THERAPEUTICS.

MEDICINE.

SURGERY.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

OBSTETRICS.

GYNECOLOGY.

PATHOLOGY AND BACTERIOLOGY.

ADAPTATION IN PATHOLOGICAL PROCESSES.[1]

By William H. Welch, M.D.,
PROFESSOR OF PATHOLOGY, JOHNS HOPKINS UNIVERSITY.

Grateful as I am for the personal good-will manifested by my selection as President of this Congress, I interpret this great and unexpected honor as an expression of your desire to give conspicuous recognition to those branches of medical science not directly concerned with professional practice, and as such I acknowledge it with sincere thanks.

All departments represented in this Congress are working together toward the solution of those great problems—the causes and the nature, the prevention and the cure, of disease—which have always been and must continue to be the ultimate objects of investigation in medicine. It is this unity of purpose which gives to the history of medicine, from its oldest records to the present time, a continuity of interest and of development not possessed in equal degree by any other department of knowledge. It is this same unity of purpose which joins together into a single, effective organism the component groups of this Congress, representing, as they do, that principle of specialization and subdivision of labor which, notwithstanding its perils, has been the great factor in medical progress in modern times.

Medical science is advanced not only by those who labor at the bedside, but also by those who in the laboratory devote themselves to the study of the structure and functions of the body in health and disease. It is one of the most gratifying results of the rapid advance in medical

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[1] Address of the President before the Fourth Congress of American Physicians and Surgeons, held in Washington, May 4-6, 1897.

education in this country during the last few years that successful workers in the laboratory may now expect some of those substantial rewards which formerly were to be looked for almost exclusively in the fields of practical medicine and surgery. We already have abundant assurance that the steady improvement in opportunities and recompense and other material conditions essential for the prosecution of scientific work in medicine will enable this country to contribute to the progress of the medical sciences a share commensurate with its great resources and development in civilization.

The subject of "Adaptation in Pathological Processes," which I have selected for my address on this occasion, is one which possesses the broadest biological, as well as medical, interests. It is this breadth of scientific and practical interest that must justify my choice of a theme which involves many technical considerations and many problems among the most obscure and unsettled in the whole range of biology and of medicine.

I shall employ the epithet "adaptive" to describe morbid processes which bring about some sort of adjustment to changed conditions due to injury or disease. In view of the more technical and restricted meaning sometimes attached to the term "adaptation" in biology, objection may be made to this broad and general application of the word in pathology; but no more suitable and convenient epithet than "adaptive" has occurred to me to designate the entire group of pathological processes whose results tend to the restoration or compensation of damaged structure or function, or to the direct destruction or neutralization of injurious agents. Processes which may be described variously as compensatory, regenerative, self-regulatory, protective, healing, are thus included under adaptive pathological processes. These processes are, in general, more or less advantageous or useful to the individual; but for reasons which will be stated later the conception of pathological adaptation and that of advantage to the individual are not wholly coextensive.

Within the limits of an address I cannot hope to do more than direct attention to some of those aspects of the subject which seem to me to be of special significance. Although most striking examples of adaptation are to be sought in comparative and vegetable pathology, what I shall have to say will relate mostly to human pathology. My purpose is not to point out the beauties or the extent of adaptations in pathological processes, but rather to say something concerning the general mechanism of their production and the proper attitude of mind regarding them, and to illustrate the general principles involved by a few representative examples.

It has been contended that the conception of adaptation has no place in scientific inquiry; that we are justified in asking only by what means

a natural phenomenon is brought about, and not what is its meaning or purpose; in other words, that the only question open to scientific investigation is How? and never Why? I hope to make clear by what follows in what light I regard this question, and in this connection I shall simply quote Lotze, who, beginning as a pathologist, became a great philosopher: "Every natural phenomenon may be investigated not only with reference to the mathematical grounds of its possibility and the causes of its occurrence, but also as regards the meaning or idea which it represents in the world of phenomena."

The most wonderful and characteristic attribute of living organisms is their active adaptation to external and internal conditions in such a way as tends to the welfare of the individual or of the species. Of the countless physiological examples which might be cited to illustrate this principle, I select, almost at random, the preservation of the normal temperature of the body in warm-blooded animals under varying external temperatures and varying internal production of heat, the regulation of respiration according to the need of the tissues for oxygen, the influence of the load upon the work performed by muscles, the accommodation of the heart to the work demanded of it, the response of glands to increased functional stimulation, the adjustment of the iris to varying degrees of illumination, the influence of varying static conditions upon the internal architecture of bone.

The most striking characteristic of these countless adaptations is their apparent purposefulness. Even if it be true, as has been said by Lange, that "the formal purposefulness of the world is nothing else than its adaptation to our understanding," it is none the less true that the human mind is so constituted as to desire and seek an explanation of the adaptations which it finds everywhere in organic nature. From the days of Empedocles and of Aristotle up to the present time there have been two leading theories to explain the apparent purposefulness of organic nature—the one, the teleological, and the other, the mechanical theory. The teleological theory, in its traditional signification, implies something in the nature of an intelligence working for a predetermined end. So far as the existing order of nature is concerned, the mechanical theory is the only one open to scientific investigation, and it forms the working hypothesis of most biologists. This theory, in its modern form, seeks an explanation of the adaptations of living beings in factors concerned in organic evolution. What these factors are we know only in part. Those which are most generally recognized as operative are variation, natural selection, and heredity. That additional factors, at present little understood, are concerned seems highly probable. The acceptance of the explanation of physiological adaptations furnished by the doctrine of organic evolution helps us, I believe, in the study of pathological adaptations.

As the word "teleology" has come to have, in the minds of many, so bad a repute in the biological sciences, and as I desire, without entering into any elaborate discussion of the subtle questions here involved, to avoid misconceptions in discussing subjects whose ultimate explanation is at present beyond our ken, I shall here briefly state my opinion that all of those vital manifestations to which are applied such epithets as adaptive, regulatory, regenerative, compensatory, protective, are the necessary results of the action of forms of energy upon living matter. The final result, however useful and purposeful it may be, in no way directly influences the chain of events which leads to its production, and, therefore, the character of the result affords no explanation whatever of the mechanism by which the end, whether it appear purposeful or not, has been accomplished. In every case the ultimate aim of inquiry is a mechanical explanation of the process in question. Notwithstanding valuable contributions, especially within recent years, toward such mechanical explanations, we are still far removed from the attainment of this aim.

The knowledge of the fact that the living body is possessed of means calculated to counteract the effects of injurious agencies which threaten or actually damage its integrity must have existed as long as the knowledge of injury and disease, for the most casual observation teaches that wounds are repaired and diseases are recovered from. It is no part of my present purpose to trace the history of the numerous speculations or even of the development of our exact knowledge concerning the subjects here under consideration. I cannot refrain, however, from merely referring to the important *rôle* which the conception of disease as in some way conservative or combative in the presence of harmful influences has played from ancient times to the present in the history of medical doctrines. Whole systems of medicine have been founded upon this conception, clothed in varying garb. There is nothing new even in the image, so popular nowadays, representing certain morbid processes as a struggle on the part of forces within the body against the attacks of harmful agents from the outer world. Indeed, Stahl's whole conception of disease was that it represented such a struggle between the anima and noxious agents. What lends especial interest to these theories is that then, as now, they profoundly influenced medical practice and were the origin of such well-known expressions as *vis medicatrix naturæ* and *medicus est minister naturæ*.

It is needless to say that there could be no exact knowledge of the extent of operation or of the nature of processes which restore or compensate damaged structures and functions of the body or combat injurious agents, before accurate information was gained of the organization and workings of the body in health and in disease. Although the way was opened by Harvey's discovery of the circulation of the blood, most of our precise knowledge of these subjects has been obtained during the

present century, through clinical observations and pathological and biological studies. In the domain of infectious diseases wonderful and hitherto undreamed of protective agencies have been revealed by modern bacteriological discoveries. Here, as elsewhere in medicine, the experimental method has been an indispensable instrument for discoveries of the highest importance and for the comprehension of otherwise inexplicable facts. Very interesting and suggestive results, shedding light upon many of the deeper problems concerning the nature and power of response of living organisms to changed conditions have been obtained in those new fields of experimental research called by Roux the mechanics of development of organisms, and also in part designated physiological or experimental morphology. Although we seem to be as far removed as ever from the solution of the most fundamental problem in biology, the origin of the power of living beings to adjust themselves actively to internal and external relations, we have learned something from these investigations as to the parts played respectively by the inherited organization of cells and by changes of internal and external environment in the processes of development, growth, and regeneration.

In physiological adaptations, such as those which have been mentioned, the cells respond to changed conditions to meet which they are especially fitted by innate properties, determined, we must believe, in large part by evolutionary factors. In considering pathological adaptations the question at once suggests itself whether the cells possess any similar peculiar fitness to meet the morbid changes concerned; whether, in other words, we may suppose that evolutionary factors have operated in any direct way to secure for the cells of the body properties especially suited to meet pathological emergencies. Can we recognize in adaptive pathological processes any manifestations of cellular properties which we may not suppose the cells to possess for physiological uses? This question appears to me to be of considerable interest. I believe that it can be shown that most pathological adaptations have their foundation in physiological processes or mechanisms. In the case of some of these adaptations, however, we have not sufficiently clear insight into the real nature of the pathological process nor into all of the physiological properties of the cells concerned to enable us to give a positive answer to the question.

While we must believe that variation and natural selection combined with heredity have been important factors in the development and maintenance of adjustments to normal conditions of environment, it is difficult to see how they could have intervened in any direct way in behalf of most pathological adaptations.

An illustration will make clear the points here involved. Suppose the human race, or any species of animal, to lack the power to compensate the disturbance of the circulation caused by a damaged heart-valve, and that an individual should happen to be born with the exclusive

capacity of such compensation. The chances are that there would arise no opportunity for the display of this new capacity, and it is inconceivable that the variety would be perpetuated through the operation of the law of survival of the fittest by natural selection, unless leaky or clogged heart-valves became a common character of the species. When, however, we learn that the disturbance of circulation resulting from disease of the heart-valves is compensated by the performance of increased work on the part of the heart, and that it is a general law that such prolonged extra work leads to growth of muscle, we see at once that this compensation is only an individual instance of the operation of a capacity which has abundant opportunities for exercise in normal life where the influence of natural selection and other factors of evolution can exert their full power.

In a similar light we can regard other compensatory and functional pathological hypertrophies—indeed, I believe, also to a considerable extent the pathological regenerations, inflammation, and immunity, although here the underlying factors are, of course, different.

We may, however, reasonably suppose that natural selection may be operative in securing protective adjustments, such as racial immunity, against morbific influences to which living beings are frequently exposed for long periods of time and through many generations.

These considerations help us to explain the marked imperfections of most pathological adaptations as contrasted with the perfection of physiological adjustments, although I would not be understood to imply that the absence of the direct intervention of natural selection in the former is the sole explanation of this difference. The cells are endowed with innate properties especially fitted to secure physiological adaptations. No other weapons than these same cells does the body possess to meet assaults from without, to compensate lesions, to restore damaged and lost parts. But these weapons were not forged to meet the special emergencies of pathological conditions. Evolutionary factors have not in general intervened with any direct reference to their adaptation to these emergencies. Such fitness as these weapons possess for these purposes comes primarily from properties pertaining to their physiological uses. They may be admirably fitted to meet certain pathological conditions, but often they are inadequate. Especially do we miss in pathological adjustments that co-ordinated fitness so characteristic of physiological adaptations. So true is this that the propriety of using such terms as compensation and adaptation for any results of pathological processes has been questioned.

A heart hypertrophied in consequence of valvular lesion does not completely restore the normal condition of the circulation. Experience has shown that a kidney hypertrophied in consequence of deficiency of the other kidney is more susceptible to disease than the normal organ.

What an incomplete repair of defects is the formation of scar-tissue, and with what inconveniences and even dangers may it be attended in some situations! If we look upon inflammation as an attempt to repair injury, and, therefore, as an adaptive process, with what imperfections and excesses and disorders and failures is it often associated! How often in some complex pathological process, such as Bright's disease or cirrhosis of the liver, can we detect some adaptive features, attempts at repair or compensation, but these overshadowed by disorganizing and harmful changes.

It is often difficult to disentangle in the complicated processes of disease those elements which we may appropriately regard as adaptive from those which are wholly disorderly and injurious. There are usually two sides to the shield, and one observer from his point of view may see only the side of disorder, and another from a different point of view, only that of adaptation.

The conception of adaptation in a pathological process is not wholly covered by that of benefit to the individual. I understand, as has already been said, by an adaptive pathological process one which in its results brings about some sort of adjustment to changed conditions. This adjustment is usually, wholly or in part, advantageous to the individual; but it is not necessarily so, and it may be harmful. The closure of pathological defects by new growths of tissue is a process which must be regarded as adaptive. But one would hardly describe as advantageous the scar in the brain which causes epilepsy. A new growth of bone to fill in defects is often highly beneficial; but what grave consequences may result from thickening of the skull to help fill the space left by partial arrest in development of the brain in embryonic life or infancy! We see here, as everywhere, that " Nature is neither kind nor cruel, but simply obedient to law, and, therefore, consistent."

In turning now to the more special, but necessarily fragmentary, consideration of a few of the pathological processes in which adaptation, in the sense defined, is more or less apparent, I shall have in view the answers to those two questions, What is the meaning of the process? and How is it caused? which confront us in our investigation of all natural phenomena. At the outset it must be admitted that our insight into the nature of many of these processes is very imperfect, and that here answers to the world-old riddles Why? and How? are correspondingly incomplete and liable to err.

Although almost all of the elementary morbid processes, even the degenerations and death of cells, may, under certain conditions of the body, serve a useful purpose—the pre-eminent examples of pathological adaptation, in the sense of restoration or compensation of damaged structure or function, or the direct destruction or neutralization of injurious agents, are to be found among the compensatory hypertrophies,

the regenerations, and the protective processes. To this last ill-defined group I refer parasiticidal and antitoxic phenomena, and some of the manifestations of inflammation, and perhaps also of fever. In the last analysis these protective processes, no less than the others mentioned, must depend upon the activities of cells.

As it is manifestly impossible within the limits of a general address to attempt a detailed consideration of any large number of these adaptive pathological processes, and as such consideration would necessarily involve the discussion of many technical and doubtful points, I have thought that my purpose would be best served by the selection of a few representative examples.

The compensatory hypertrophies afford admirable illustrations of certain fundamental principles regarding adaptations in pathology which I have already stated. The hypertrophy secures a functional adjustment, often of a highly beneficial character, to certain morbid conditions. This useful purpose is attained by a succession of events determined from beginning to end by the necessary response of cells and tissues, in consequence of their inherent organization, to the changed conditions. Given the changed conditions, on the one hand, and the organization of the cells, on the other, the result must follow as surely as night follows day, and this final result influences the preceding series of events no more in the one case than in the other. That the cells possess the particular organization determining the manner of their response to these changed conditions, and, therefore, the beneficial character of the result, is dependent upon innate properties whose fitness for the purpose doubtless has been largely fixed by evolutionary factors, operating, however, mainly in behalf of physiological functions and not directly toward pathological adjustments. In correspondence with this view we find that our knowledge of the manner of production of the compensatory hypertrophies of various organs and tissues stands in direct relation to our knowledge of the physiology of the same organs and tissues.

Those compensatory hypertrophies into the mechanism of whose production we have the clearest insight are referable to increased functional activity, and are, therefore, spoken of as work-hypertrophies. This has been proved for the muscular hypertrophies and compensatory hypertrophy of the kidney; but the demonstration is not equally conclusive for the compensatory hypertrophy of other glands. I know, however, of no instance in which this factor in the explanation can be positively excluded.

The relationship between increased functional activity and hypertrophy is so evident in many cases that there is strong presumption in favor of this explanation of those glandular compensatory hypertrophies which have not as yet been clearly referred to the class of functional

hypertrophies. The very occurrence of compensatory hypertrophy of an organ may direct attention to the fact that it is endowed with definite functions, and the conditions under which the hypertrophy occurs may shed light upon the nature of these functions. I need only remind you of the significance from this point of view of the compensatory hypertrophy of the thyroid, adrenal, pituitary, and other glands with internal secretions. I fail to see why Nothnagel should consider à priori improbable the occurrence of compensatory hypertrophy of one sexual gland after loss of the other, even before sexual maturity, or why Ribbert, who has apparently demonstrated experimentally such an occurrence, should find it necessary to seek the explanation in reflex nervous influences or mere hyperæmia. The so-called secondary sexual characters and the changes following castration, including the influence upon a hypertrophied prostate, point to important, even if little understood, functions which for the present we can perhaps best attribute to so-called internal secretions of these sexual organs.

The name compensatory hypertrophy is sometimes applied to growths of tissue that merely take the place of another kind of tissue which has fallen out, as, for example, the growth of adipose tissue around a shrunken kidney or pancreas, or between atrophied muscle-fibres. Here there is only compensation of space, but no compensation of structure or function. Such hypertrophies and growths are described better as complementary than compensatory.

Familiar examples of pathological hypertrophies from increased work are the hypertrophy of the heart from valvular disease and other causes, that of the muscular coats of canals and bladders behind some obstruction, and that of one kidney after loss or atrophy of the other.

In order to understand fully the manner of production of work-hypertrophy of a part resulting from some morbid condition, it is essential to know the nature of the disturbances induced by the underlying morbid condition, how these disturbances excite increased functional activity of the part which becomes hypertrophied, and what the relation is between this greater activity and the increased growth of the part.

It is impossible on this occasion to go through the whole list of compensatory hypertrophies with reference to the application of these principles. In no instance can the requirements stated be completely met in the present state of our knowledge. It will suffice for an understanding of the principles involved, and it is only with these that I am now concerned, if I take a concrete example. I select the classical and best studied one—compensatory hypertrophy of the heart. I trust that I shall be pardoned for selecting so commonplace an illustration, as the main points involved must be familiar to most of my audience; but it is possible that the application made of them may not be equally familiar. The only matters essential to my present line of argument are the

mechanism of production of the hypertrophy and the general character of the adaptation thereby secured.

The heart, like other organs of the body, does not work ordinarily up to its full capacity, but it is capable of doing at least three or four times its usual work. The excess of energy brought into play in doing this extra work is called conveniently, although not without some impropriety, "reserve force." It has been proved experimentally that this storehouse of reserve power is sufficient to enable the healthy heart, at least that of a dog, to accommodate itself at once or after a few beats to high degrees of insufficiency or obstruction at its valvular orifices without alteration in the mean pressure and speed of the blood in the arteries. But even so tireless and accommodating an organ as the heart cannot be driven at such high pressure without sooner or later becoming fatigued, and consequently so dilated as to fail to meet the demands upon it. If it is to continue long the extra work, it must receive new increments of energy.

The cardiac muscle is far less susceptible to fatigue than the skeletal muscles, but that it may become fatigued seems to me clear.

Leaving out of consideration some doubtful causes of cardiac hypertrophy, such as nervous influences, the various morbid conditions which lead to this affection are such as increase either the volume of blood to be expelled with each stroke, or the resistance to blood-flow caused by the pressure in the arteries or by narrowing at one of the valvular orifices, or both. Unless some regulating mechanism steps in, each of these circulatory disturbances must increase the resistance to contraction of the cardiac muscle, and it is evident that the heart must do extra work if it is to pump the blood through the arteries with normal pressure and speed. It is, however, no explanation of this extra work simply to say that it occurs because there is demand for it. Increased work by the heart in cases of disease of its nutrient arteries would often meet a most urgent demand on the part of the body, but here the heart flags and fails.

The physiologists have given us at least some insight into the mechanism by which the heart responds through increased work to the circulatory disturbances which have been mentioned. These disturbances all increase the strain on the wall of one or more of the cavities of the heart; in other words, increase the tension of the cardiac muscle, in much the same way as a weight augments the tension of a voluntary muscle. Now it is a fundamental physiological law that with a given stimulus greater tension of a muscle, within limits, excites to more powerful contraction, and thus to the performance of greater work. It seems clear that this law applies to the muscle of the heart, as well as to voluntary muscle. We do not know precisely how increased tension facilitates the expenditure of greater muscular energy.

Another well-known fact in the mechanics of muscle is of importance in this connection. With increase of muscular tension under a given stimulus a point is reached where the extent of contraction is diminished, although the mechanical work done, determined by multiplying the height to which the load is lifted by the weight of the load, is increased. This law applied to the heart, whose contractions are always maximal for the conditions present at any given time, signifies that, with increased resistance to the contraction of the muscular wall of one of its cavities, this cavity will empty itself during systole less completely than before. In other words, dilatation occurs, and, as has been shown by Roy and Adami, to whom we owe important contributions on this as well as on many other points relating to the mechanics of the heart, dilatation regularly antedates hypertrophy. This primary dilatation, however, is not to be looked upon as evidence of beginning heart-failure, for, as these investigators have pointed out, it is within limits only an exaggeration of a physiological condition, and can be subsequently overcome by hypertrophy, which, in consequence of increase in the sectional area of the muscle, lessens the strain upon each fibre, and thereby permits it to shorten more during contraction. If this result is completely secured, we have simple hypertrophy. More often the dilatation remains, and must necessarily remain, and we have excentric hypertrophy, which secures, for a time at least, adequate, but I do not think we can say perfect, compensation.

The weight of existing evidence favors the view that the power of the heart to adapt its work to the resistance offered resides primarily in its muscle-cells, and not in intrinsic or extrinsic nervous mechanisms, although doubtless these latter in various ways, which cannot be here considered, influence and support this regulating capacity. Nor can I here pause to discuss the influence of blood-supply to the cardiac muscle upon the force of ventricular contraction, although Porter has demonstrated that this is important.

In tracing the steps from the primary morbid condition to the final hypertrophy, we have thus far had to deal mostly with known mechanical factors. We now come to the question, How does increased functional activity lead to increased growth?

Inasmuch as greater functional activity is regularly associated with a larger supply of blood to the more active part, the view is advocated by many that the increased growth is the direct result of this hyperæmia, and one often encounters, especially in biological literature, this opinion expressed as if it were an indisputable fact. There is, however, no conclusive proof of this doctrine, and many facts speak against it. The examples from human pathology commonly cited to support the doctrine that local active hyperæmia incites growth of cells are, so far as I am able to judge, complicated with other factors, such as injury, inflam-

mation, or trophic disturbances. Transplantation-experiments, such as
John Hunter's grafting the cock's spur upon the cock's comb, sometimes
adduced in this connection, are not decisive of this question, for here a
new circumstance is introduced which some suppose to be the determining
one for all morbid cell-growth, namely, the disturbance of the normal equi-
librium between parts. Local active hyperæmia may exist for a long
time without evidence of increased growth in the congested part. To
say that the hyperæmia must be functional is at once to concede that it
is not the sole factor. Experiments from Bizzozero's laboratory, by
Morpurgo and by Penzo, indicate that local hyperæmia due to vaso-
motor paralysis, or to the application of heat, favors cell-multiplication
in parts where proliferation of cells is a normal phenomenon or is present
from pathological causes, but that it is incapable of stimulating to
growth cells whose proliferating power is suspended under physiological
conditions, as in developed connective tissue, muscles, and the kidneys.

It has been usually assumed that the way in which local hyperæmia
may stimulate cell-growth is by increasing the supply of nutriment to
cells. The trend of physiological investigation, however, indicates that
the cell to a large extent regulates its own metabolism. If the cell needs
more food, of course it cannot get it unless the supply is at hand, and
in this sense we can understand how a larger supply of blood may be
essential to increased growth, but this is a very different thing from say-
ing that the augmented blood-supply causes the growth.

It is by no means clear that the question as to the influence of
increased blood-supply upon cell-growth is identical with that of
increased lymph-supply. The experiments of Paschutin and of Em-
minghaus, from Ludwig's laboratory, nearly a quarter of a century ago,
indicate that local hyperæmia due to vasomotor paralysis does not, as a
rule, increase the production of lymph; and more recent experiments,
although not wholly concordant in their results upon this point, tend to
the same conclusion. Functional activity, however, has a marked influ-
ence in increasing the quantity and affecting the quality of lymph in
the active part. Our knowledge of the physical and chemical changes
in working muscles and glands enables us to conceive why this should
be so, for all are now agreed that the formation of lymph is due not
simply to filtration from the blood-plasma, but also to diffusion, and
some believe likewise to active secretion by the capillary endothelium.
Doubtless arterial hyperæmia is essential to the maintenance of the
increased flow of lymph in working organs.

There are difficulties in the way of supposing that increased supply
of lymph in itself furnishes the explanation of cell-growth, and especi-
ally of that which characterizes hypertrophy of muscles and glands.
Pathologists have frequent opportunities to study the effects of all
degrees of increased production and circulation of lymph associated

with venous hyperæmia. A kidney or a muscle may from this cause be
subjected for months and years to an excess of lymph-flow, but there is
no demonstration of any consequent hypertrophy or hyperplasia of renal
epithelium or muscle-cell. It is true that the chemical composition of
the lymph is not the same as that of lymph resulting from increased
function, and it is possible that in this chemical difference lies the kernel
of the whole matter. It may also be urged that in venous hyperæmia
there are circumstances which restrain or prevent growth. Neverthe-
less, if overfeeding, merely in consequence of increased supply of nutri-
ment, were the real explanation of work-hypertrophies, one would expect
to find some evidence of this in the class of cases mentioned.

Ribbert has recently given a new shape to the doctrine that local
hyperæmia excites growth. While rejecting the usual explanation that
it does so by supplying more food, he contends that distention of the
bloodvessels and lymph-spaces, by mechanically disturbing the mutual
relations of parts, removes obstacles to growth. This theory cannot be
advantageously discussed until the fact is first established that uncom-
plicated local hyperæmia does incite growth.

As the matter now stands, it seems to me that any satisfactory expla-
nation of the cell-growth causing work-hypertrophies must start from
physical or chemical changes in the muscle- or gland-cell itself directly
connected with the increased function. These changes are the *primum
mobile*, and, however important increased supply of blood or lymph may
be in the subsequent chain of events, it is not the determining factor.
The whole problem is part of the general one of the causes of patholog-
ical cell-growth, to which I shall have occasion to refer again.

It is interesting to note that not all kinds of excess of functional
activity lead to hypertrophy. A heart may beat for years faster than
normal without becoming hypertrophied. Small movements of muscle,
often repeated, do not cause hypertrophy. It would appear that the
amount of work done in each functional act must attain a certain
height in order to stimulate growth. On the other hand, if the muscle
be stretched beyond certain limits, it does not hypertrophy; on the con-
trary, it may atrophy, as may be seen in greatly distended canals and
cavities with muscular walls. This behavior is also in accordance with
physiological observations.

The compensatory hypertrophy of muscle seems to be due mainly to
increase in the size of cells, although there are observations indicating
that they may also multiply. That of most glands is referable to in-
crease both in number and size of cells. Within four or five days after
extirpation of a kidney karyokinetic figures may be found in increased
number in the cells of the remaining kidney.

The general character of the adaptation secured by compensatory
hypertrophy of the heart is sufficiently well known. I wish to point

out certain of its imperfections. I shall not dwell upon the well-known abnormal conditions, with their remote consequences, of the systemic or pulmonary circulation, which are present during the stage of compensation, nor shall I speak of the various circumstances which may interfere with the establishment of compensatory hypertrophy.

The muscle of a hypertrophied heart is sometimes compared to that of the blacksmith's arm, and the statement is made that there is no reason inherent in the muscle itself why the one should fail more than the other. This may be true, but it is not self-evident. Exercise may influence in various ways the nutrition, function, and growth of muscle as well as of other parts. Mere increase in bulk is a coarse effect. Quality may be improved as well as quantity. The biggest muscle is not necessarily the best or the most powerful. As every trainer knows, various conditions under which work is done influence the result. Increase in the reserve energy of the heart, secured by judicious exercise—and this is the main factor in endurance—probably cannot be attributed mainly to hypertrophy ; indeed, enlargement of this organ from exercise is often a serious condition. Much more might be said in this line of thought, but I have indicated why it seems to me unjustifiable to assume, without further evidence, that the condition of the muscle in pathological hypertrophies is necessarily identical in all respects with that in physiological hypertrophies.

There is an important difference in the working-conditions between most hypertrophied hearts and the normal heart. Although the maximal available energy of a hypertrophied heart during compensation is greater than that of the normal heart, clinical experience shows that in the majority of cases the energy available for unusual demands—that is, the so-called reserve force—is less in the former than in the latter. Sometimes, especially when the hypertrophy has developed in early life, the hypertrophied heart is at no disadvantage in this respect. As pointed out with especial clearness by Martius, the significance of this alteration in the ratio normally existing between the energy expended for ordinary needs and that available for unusual demands, is that it furnishes an explanation of the greater liability of the hypertrophied heart to tire upon exertion. Fatigue of the heart is manifested by dilatation of its cavities, and when this dilatation from fatigue is added to that already existing in most cases, relative insufficiency of the mitral or tricuspid valve is likely to occur, and the compensation is, at least for a time, disturbed. The circulation through the coronary arteries, whose integrity is so important for the welfare of the heart, is impaired, and a vicious circle may be established. Notwithstanding the valuable contributions from the Leipzig clinic as to the frequency of various anatomical lesions in the muscle of hypertrophied hearts, it does not seem to me necessary to have recourse to them as an indispensable factor in the explanation of

the breakage of compensation; but I shall not here enter into a discussion of the general subject of the causes of failure of compensation.

I have described with some detail, although very inadequately, the manner of production of compensatory hypertrophy of the heart, in order, by this representative example, to make clear what seem to me to be certain general characteristics of many adaptive pathological processes, and I beg here to call attention especially to the following points. As has been emphasized by Nothnagel and others, no teleological idea or form of language need enter into the explanation of the mechanism of the process. The final result is the necessary consequence of the underlying morbid conditions. We have satisfactory mechanical explanations for essential steps in the process, and there is no reason to assume that other than mechanical factors are concerned in those vital manifestations which at present we are unable to explain by known physical and chemical forces. The properties of the cells which determine the character of their response to the changed conditions are none other than their well-known physiological properties. The adaptation finally secured, admirable as it is in many respects, and perhaps adequate for a long and active life, is generally attended with marked imperfections, and, strictly speaking, is not a complete compensation. It does not present that co-ordinate and special fitness which we are accustomed to find in physiological adaptations, for the explanation of which so much has been gained by the study of the factors concerned in organic evolution.

It may be argued that under the circumstances no better kind or degree of adaptation can be conceived of than that which actually occurs, and that the operation of evolutionary factors, with especial reference to the adjustment of the organism to the conditions causing cardiac hypertrophy, could not secure any better result. I think that it is not difficult to conceive how improvements might be introduced. It is, however, permissible to suppose that the introduction into the workings of the organism of some better mechanism to compensate the morbid conditions might be at the sacrifice of more important physiological attributes of the body. More perfect pathological adaptations might in many instances involve a deterioration of the physiological characters of the species. It is often the case that the more highly organized living beings lack some capacity possessed by those lower in the scale of organization to resist or compensate injury and disease. This is notably true of the power to regenerate lost parts. It is, however, along the lines of improvement in the physiological characters of the individual or species that the opportunity often lies for securing increased resistance to disease or better pathological adaptations.

It would be interesting to continue our consideration of the compensatory hypertrophies by an examination of those of glandular organs from points of view similar to those adopted for the heart. For the kidney,

at least, the materials are at hand for such a purpose; but, as I desire in the limited time at my disposal to touch upon other varieties of pathological adaptation, I must refer those interested especially to the investigations of Grawitz and Israel, Ribbert, Nothnagel, and Sacerdotti as to the conditions underlying compensatory hypertrophy of the kidney. I can likewise merely call attention to the interesting researches of Ponfick upon the most wonderful of the compensatory hypertrophies in higher animals, that of the liver. Ponfick, as is well known, has demonstrated that after removal of three-fourths of this organ new liver-substance, with normal functions, is recreated from the remainder and to an amount nearly equalling that which was lost.

The chapter of pathological adaptations in bones and joints I shall leave untouched, notwithstanding the admirable illustrations which might be drawn from this domain.

There is no more fascinating field for the study of pathological adaptations with reference to the mechanical factors involved than that furnished by the bloodvessels, as has been shown especially by the brilliant researches of Thoma. With wonderful precision can a vessel or system of vessels adjust itself to changes in the pressure, velocity, and quantity of blood, and thereby serve the needs of the tissues for blood. Under pathological, as well as physiological, conditions this adjustment may be brought about not only through the agency of vasomotor nerves and the physical properties of the vascular wall, but also, when the necessity arises, by changes in the structure of the wall.

The changes in the circulation introduced by the falling out of the placental system at birth are essentially the same as those resulting from amputation of an extremity, and the consequent alterations in the structure of the umbilical artery are identical with those in the main artery of the stump after amputation. The closure of the ductus Botalli and the ductus venosus soon after birth, and, still better, transformations of vessels in the embryo, furnish physiological paradigms for the development of a collateral circulation. Many other illustrations might be cited, did time permit, to show that in the processes of normal development, growth and regressive metamorphosis of parts, both before and after birth, and in menstruation and pregnancy, changed conditions of the circulation arise analogous to certain ones observed under pathological circumstances, and that the mode of adjustment to these changes by means of anatomical alterations in the vessels may be essentially the same in the physiological as in the morbid state. I see in these facts an explanation of the relative perfection of certain vascular adaptations to pathological or artificial states, as may be exemplified by changes in a ligated artery and by the development of a collateral circulation. The mechanisms by which the adjustments are secured have, in consequence of their physiological uses, for reasons already explained, a special

fitness to meet certain pathological conditions. That this fitness should
be greater in youth than in old age is in accordance with laws of life,
indicated with especial clearness by Minot in his interesting studies on
" Senescence and Rejuvenation."

But these mechanisms are not equally well adapted to meet all mor-
bid changes in the vessels. Although Thoma's interpretation of the
fibrous thickening of the inner lining of vessels in arteriosclerosis and
aneurism as compensatory, or, as I should prefer to say, adaptive, is
not accepted by all pathologists, it seems to me the best explanation in
many cases. But the adaptation, if it be such, is here usually of a very
imperfect nature, and it is not surprising that it should be so, when one
considers the improbability of any mechanism developing under physio-
logical conditions which should be specially fitted to meet the particular
morbid changes underlying aneurism and arteriosclerosis.

I shall not be able to enter into a consideration of the mechanical
factors concerned in adaptive pathological processes in bloodvessels,
although perhaps in no other field are to be found more pertinent illus-
trations of the views here advocated concerning pathological adapta-
tions. The whole subject has been studied from the mechanical side
most fully and ably by Thoma, whose four beautifully simple histo-
mechanical principles are at any rate very suggestive and helpful work-
ing-hypotheses, even if it should prove, as seems to me probable, that
they are too exclusive. I shall call attention in this connection only
to the inadequacy of the old and still often adopted explanation of
the development of a collateral circulation. The rapidity with which
a collateral circulation may be established after ligation of a large artery,
even when the anastomosing branches are very small, is known to every
surgeon. This was formerly attributed to increase of pressure above
the ligature; but this rise of pressure has been shown to be too small to
furnish a satisfactory explanation, and Nothnagel has demonstrated that
there is little or no change in the calibre of arteries coming off close
above the ligature unless they communicate with branches arising below
the ligature. Von Recklinghausen several years ago suggested a better
explanation. The bed of the capillary stream for the anastomosing
arteries is widened by ligation of the main artery, inasmuch as the
blood can now flow with little resistance from the capillaries of the
anastomosing branches into those of the ligated artery. The result is
increased rapidity of blood-flow in the anastomosing vessels. Accord-
ing to one of Thoma's histo-mechanical principles, increased velocity of
the blood-current results in increased growth of the vessel-wall in super-
ficies—that is, in widening of the lumen. The tension of the vessel-
wall, which is dependent on the diameter of the vessel and the blood-
pressure, is, according to Thoma, thus increased; and, according to
another of his principles, this greater tension results in growth of the

vascular wall in thickness. The changes in the walls of the anastomos-
ing vessels seem to me best interpreted as referable to a genuine work-
hypertrophy, a conception which has already been advanced by Ziegler.

The pathological regenerations constitute a large group of adaptive
morbid processes of the highest interest. Their study has become almost
a specialized department of biology, and occupies a very prominent
place in the extensive literature of recent years relating to experimental
or physiological morphology. It has revealed in unexpected ways the
influence of external environment upon the activities of cells, as is
illustrated in a very striking manner by Loeb's studies of heteromor-
phosis.

Although the capacity to regenerate lost parts must reside in the
inherited organization of the participating cells, there are observations
which seem to indicate that in the lower animals this capacity may exist
independently of any opportunity for its exercise during any period of
the normal life of the individual or species or their ancestors, including
the period of embryonic development. This is the inference which has
been drawn from Wolff's observation, that after complete extirpation of
the ocular lens with the capsular epithelium in the larval salamander, a
new lens is reproduced from the posterior epithelium of the iris. There
are other observations of similar purport. The acceptance of this infer-
ence, however, seems to me to involve such difficulties that we may
reasonably expect that further investigations will afford more satisfac-
tory explanations of these curious and puzzling phenomena of regenera-
tion. Of much interest and significance are the so-called atavistic
regenerations, where the regenerated part assumes characters belonging
not to the variety or species in which it occurs, but to some ancestral or
allied species. For these and other reasons Driesch refers the patho-
logical regenerations to what he calls the secondary self-regulations, by
which term he designates those adjustments of artificially induced dis-
turbances which are brought about by factors foreign to the normal
development and life of the individual.

The view advocated by Barfurth seems to me more probable, that the
pathological regenerations depend upon cellular properties pertaining to
the normal life of the organism. This view is supported by the fact
that, with a few probably only apparent exceptions, the regenerations
conform to the law of specificity of cells. The pathological regenerations
occurring after birth can be referred to the retention in greater or less
degree of formative powers possessed by the cells pre-eminently in
embryonic life. These powers in general tend gradually to diminution
or extinction as the individual grows older, although in some cells, such
as the covering epithelium of the skin and mucous membranes, this loss
of regenerative power with advancing years is scarcely manifest. Even
after the cessation of growth the regenerative capacity is not wholly in

abeyance under physiological conditions. Bizzozero has studied and classified the various tissues of the body according to the activity of their physiological regeneration.

In general, the more highly differentiated and specialized a cell, the less is its capacity for regeneration; but we now know that such differentiation is attended with less sacrifice of its regenerative power than was once supposed. Even such highly specialized cells as those of striped muscle are capable of regeneration. Indeed, the nerve-cells seem to be the only ones incapable of proliferation, and even this is not certain, for there are competent observers who claim that these cells may multiply, although there is no evidence that in the higher animals they can give rise to functionally active new nerve-cells. The ease with which a part of the nerve-cell, namely, its axis-cylinder process, can be regenerated is well known.

The cell-proliferation in regeneration is attributed to the removal of resistance to growth in consequence of the defect resulting from loss of tissue. It has been pointed out, especially by Ziegler and by Ribbert, that not only cells in the immediate neighborhood of the defect multiply, but likewise those at such a distance that it is difficult to suppose that the latter have been directly influenced by the loss of tension in the tissues caused by the defect. Ziegler refers the proliferation of the distant cells to compensatory hypertrophy, and Ribbert attributes it to hyperæmia resulting from the presence in the defect of foreign materials, such as extravasated blood, exudation, and necrotic tissue.

We are brought here, as we were in the consideration of the compensatory hypertrophies, to one of the most fundamental and important questions in pathology—the causes of pathological cell-growth. The interpretation of many pathological processes as adaptive or not, hinges often upon opinions held concerning the underlying causes of cell-proliferation. The main question at issue is, How far one is willing to go in attributing cell-growth to primary defects in the tissue, and interpreting the growth as for the purpose of regeneration or filling up a defect? Differences of opinion upon this subject are illustrated by the different interpretations of the cell-proliferations in acute and chronic inflammations, some pathologists considering these to be essentially regenerative and compensatory; others regarding them, at least in large part, as directly incited by inflammatory irritants and not to be ranked wholly with the regenerative processes.

The doctrine of Virchow was long accepted without question, that inflammatory cell-growth is the result of the action of external stimuli, the so-called inflammatory irritants, upon the cells, which are thereby directly incited to grow and multiply. The attack upon this doctrine has been most vigorously led by Weigert, who denies absolutely the power of any external agencies to stimulate directly cells to prolifera-

tion. He considers that to concede such a bioplastic power to external agents is equivalent to the acceptance of a kind of spontaneous generation of living matter.

Weigert's views upon this subject have undoubtedly had a most fruitful influence upon pathology. It has been such an influence as a good working-hypothesis, whether finally demonstrated to be true or not, has often had in the development of science. In putting to the test of actual observation Weigert's hypothesis, we have been led to recognize the frequency and the importance of primary injuries to cells inflicted by external agencies. Not only various degenerations and necroses of entire cells, but more subtle and partial damage of cytoplasm and nucleus have been made the subject of special study. It has been recognized that our older methods of hardening tissues reveal often only very imperfectly the finer structure of cells, and new and better methods have been introduced which enable us to detect more delicate lesions of cell-substance which formerly escaped attention, as is well illustrated in recent studies in neuropathology. Weigert's postulate of some primary injury to the tissues as the immediate effect of mechanical, chemical, and other external agencies, which were formerly regarded as the direct stimuli of cell-growth and multiplication, has been fulfilled in many instances where such damage had previously been overlooked or unsuspected. It is his belief that in cases where we cannot now detect such primary injury more thorough search and better methods will enable us to do so. One may, of course, reasonably cherish such an expectation; but at the same time we must recognize the fact that morbid cell-proliferations occur under circumstances where we cannot at present associate them with any demonstrable injury to the tissues—indeed, in some cases where our insight into the structure of the part seems to be so clear and satisfactory that one is very reluctant to admit the existence of an undetected damage to the cells.

Perhaps the most important modification of former pathological conceptions, resulting from the belief that cell-growth is caused by primary defects and injuries of tissue, relates to the chronic interstitial inflammations or fibroid processes. The older view that in these processes the active and essential feature of the disease is the new growth of connective tissue, which strangled the more highly organized cells of the part, has been replaced to a large extent by the opinion that the primary and most important lesion is the degeneration, atrophy, or necrosis of the more specialized cells, whose place is taken by the new growth of interstitial tissue. In many instances, as in fibroid patches in the myocardium, and in many scleroses of the central nervous system, this latter conception affords the best and most natural interpretation of the facts. There are, however, great difficulties in explaining all chronic interstitial inflammations by this doctrine, and I must take side with those who

admit the occurrence, for example, in the kidney and in the liver, of primary interstitial inflammations characterized by proliferation of the connective tissue and endothelial cells.

Indeed, it seems to me that Weigert's formula is too narrow to cover all of the observed facts concerning cell-proliferation. Essential features of the theory that cells cannot be directly stimulated to growth by external agents were present in Boll's doctrine of border warfare between neighboring cells. Weigert's presentation of this theory is in a far more acceptable shape than that of Boll. A still more comprehensive statement of the general theory is that cells are incited to growth through removal of obstacles to growth in consequence of some disturbance in the normal relations or equilibrium of the cells with surrounding parts. The capacity to proliferate must be present in the cells, but with the cessation of growth this capacity is rendered latent or potential by the establishment of definite relations or an equilibrium between cells and neighboring parts, including under the latter not only adjacent cells, but also basement-substance, lymphatics, bloodvessels, tissue-juices, chemical substances, etc. It is evident that under these circumstances in only two ways can the cells be incited to growth, either by removal of resistance or obstacles to growth, or by an increase in the formative energy resident within the cell, and that in either way energy must be used, whether it be employed to remove obstacles to growth or to increase the proliferative forces within the cell.

It appears to me by no means an easy matter to decide in all cases in which of the two ways mentioned cell-proliferation is brought about. Removal of obstacles to growth, not only in the way indicated by Weigert, but also by other disturbances in the neighborhood-relations of the part, and very probably by the presence of definite chemical substances, may be the explanation of all pathological cell-growths. Certainly it would not be easy conclusively to disprove this view. Nevertheless, I fail to comprehend the inherent difficulties which some find in admitting the possibility of forms of energy, acting from without, directly increasing the formative energy of the cell; in other words, directly stimulating the cell to growth and multiplication. If such a possibility be admitted, the natural interpretation of some examples of cell-proliferation is that they are directly caused by the action of external forces, in the sense advocated by Virchow.

Students of the problems of pathological cell-growth must take into consideration not only the facts of human and allied pathology, but also those which are so rapidly accumulating in the domain of experimental embryology and morphology, to the importance of which I have repeatedly referred in this address. I would call attention especially to the observations from this source as to the influence of various changes of environment, particularly of definite chemical, thermic, and mechan-

ical changes in surrounding parts, upon the direction of movement and of growth of cells. The use at present made of chemotactic phenomena in explaining the direction of movement of cells in human pathological processes is only a very limited and inadequate application of these important observations concerning tactic and tropic stimuli. We shall probably come to realize more and more the operation of these factors in determining cell-movements and cell-growth in human pathology. We already have evidence that different kinds of leucocytes not only possess different specific functions, but also respond in different ways to definite tactic stimuli. The long-standing problem of the lymphoid cell in inflammation approaches solution along these lines of investigation.

A burning question, and one of perennial interest, relating to our subject is: How far are we justified in regarding acute inflammation as an adaptive or protective morbid process? There is fair agreement as to the essential facts of observation, but regarding their interpretation there are wide differences of opinion, and when one considers the complexity of the process and its still unsolved riddles, it is not hard to see why this should be so. Much depends upon the point of view, and in this respect there can be recognized a certain antagonism between the purely clinical and the purely pathological and experimental views, an antagonism, however, which must be reconciled by a full knowledge of the subject.

It is not likely that the purely clinical study of inflammation would ever lead to the idea that the general tendency of this process is advantageous to the patient. The more severe and extensive the inflammatory affection, the more serious, as a rule, is the condition of the patient. The surgeon sees his wounds do well or ill according to the character and extent of inflammatory complication. Measures directed to the removal of inflammatory exudation, such as the evacuation of pus from an abscess or an empyema, are the most successful methods of treatment, and the rules are embodied in ancient surgical maxims. How can one conceive of any purpose useful to the patient served by filling the air-cells of his lung with pus-cells, fibrin, and red corpuscles in pneumonia, or bathing the brain and spinal cord in serum and pus in meningitis? If nature has no better weapons than these to fight the pneumococcus or meningococcus, it may be asked, "What is their use but to drive the devil out with Beelzebub?"

But the pathologist and bacteriologist sees another aspect of the picture. An infectious micro-organism has invaded the tissues, where it multiplies and where its toxic products begin to work havoc with the surrounding cells, and by their absorption to cause constitutional symptoms and perhaps damage to remote parts. Is the destructive process to go on without any defence on the part of the body? There is attracted to the injured part an army of leucocytes from the bloodves-

sels, and perhaps other cells, from the neighboring tissues, and it has been conclusively shown that these cells can pick up foreign particles and remove them, and that they contain substances capable of destroying many micro-organisms. At the same time serum accumulates in and around the injured area, and this may aid by its chemical properties in destroying bacteria, in diluting poisons, in flushing out the part. Fibrin may appear, and some think that this may serve in some situations as a protective covering. If these agencies, hostile to the invading micro-organism, gain the upper hand, the débris is cleared away by phagocytes and other means, and the surrounding intact cells, which had already begun to multiply, produce new tissue which takes the place of that which had been destroyed. The victory, however, is not always with the cells and other defensive weapons of the body. The struggle may be prolonged, may be most unequal, may cover a large territory, and the characters and extent of the inflammation furnish an index of these different phases of the battle.

Such in bald outlines are two divergent views of inflammation.

I do not see how we can fail to recognize in that response to injury, which we call inflammation, features of adaptation. Inflammation may be in some cases the best response to secure the removal or destruction of injurious agents, but we cannot look upon it as the most perfect mode of protection of the body against invading micro-organisms. One may inoculate into three animals, even of the same species, but possessed of different individual resistance, the same quantity of the same culture of a pathogenic micro-organism and obtain sometimes the following results : The first one will present no appreciable inflammatory reaction whatever, and no evidences of any other disturbance, and examination will show that the micro organisms have quickly disappeared. The second one will develop an extensive local inflammation and survive, but after a long illness. The third one will offer little resistance to the micro-organism, which rapidly multiplies without causing marked inflammation, invades the blood or produces toxæmia, and quickly destroys the life of the animal. Now, it is evident that the best protective mechanism is that brought into action by the first animal, but that the inflammatory reaction set up in the second one is better than the absence of reaction and of other defences in the third animal.

I can scarcely do more on this occasion than to indicate some of the points of view from which it seems to me that we can best approach the study of inflammation as an adaptive process. With inflammation, as with other adaptive processes, any useful purpose subserved affords no explanation of the mechanism of the process. We should guard against all ideas which introduce, even unconsciously, the conception of something in the nature of an intelligent foresight on the part of the participating cells. The response of these cells in inflammation is a necessary

and inevitable one determined by their innate properties. Our efforts should be directed, in the first place, toward as near an approach as possible to a mechanical explanation of inflammatory processes by a study, on the one hand, of the properties and mode of action of the causes of inflammation, and, on the other hand, of the nature and source of the cellular properties concerned. We may properly inquire whether these properties fit the cells to counteract the effects of injury, and if so, whence comes this fitness. Has the fitness those attributes of relative perfection which we find in most physiological adaptations, or is it characterized by the uncertainties and imperfections of so many pathological adaptations? Is the character of the response to injury in inflammation such as to indicate that the agencies concerned have acquired through evolutionary factors a special fitness to meet the pathological emergencies? Are all or only a part of the manifestations of the inflammatory processes adaptive?

It cannot be doubted that there are innate properties of certain cells called into action in inflammation, such as those manifested in the attraction of leucocytes and other cells by definite chemical substances, the capacity of cell-proliferation from causes connected with injury, the power of phagocytosis and other bactericidal properties, which may be adapted to counteract the effects of injurious agents. When these forces bring about the prompt destruction or removal of the injurious substances and the defect is quickly repaired, the adaptation is complete and unmistakable. When, however, the inflammatory irritants and their destructive effects persist, and the proliferation of cells and accumulation of inflammatory products become excessive and occupy large areas, the features of adaptation are not so easily recognized. The mere occupation of territory by inflammatory products is often a serious injury and it can be regarded as an adaptive feature only when they fill some artificial defect. Such occupation may be in itself enough to counteract any useful work in which these products may be engaged.

We can reasonably seek in the relations of the body to the outer world an explanation of the development of certain properties of cells which serve a useful purpose in mechanical and other injuries. These properties find application also in the normal life of the organism. Their exercise in response to injury imparts to inflammation important adaptive or protective characteristics, but I fail to see in this process any such special fitness as would justify extravagant statements which have been made to the effect that inflammation ranks among the adaptations of living beings by the side of digestion and respiration.

I have endeavored in this address to present certain general considerations concerning pathological adaptations. It has been possible to bring under consideration only a small part of an immense field, and this very inadequately. We have seen that in the sense in which adap-

tation was defined we can recognize in the results of morbid processes frequent and manifold evidences of adjustment to changed conditions. These adjustments present all degrees of fitness. Some are admirably complete ; more are adequate, but far from perfect ; many are associated with such disorder and failures that it becomes difficult to detect the element of adaptation. The teleological conception of a useful purpose in no case affords au explanation of the mechanism of an adaptive process. I have suggested that the adaptability of this mechanism to bring about useful adjustments has been in large part determined by the factors of organic evolution, but that in only relatively few cases can we suppose these evolutionary factors to have intervened in behalf of morbid states. For the most part, the agencies employed are such as exist primarily for physiological uses, and while these may be all that are required to secure a good pathological adjustment, often they have no special fitness for this purpose.

The healing power of nature is, under the circumstances present in disease, frequently incomplete and imperfect, and systems of treatment based exclusively upon the idea that nature is doing the best thing possible to bring about recovery or some suitable adjustment, and should not be interfered with, rest often upon an insecure foundation. The agencies employed by nature may be all that can be desired ; they may, however, be inadequate, even helpless, and their operation may add to existing disorder. There is ample scope for the beneficent work of the physician and surgeon.

CANCER OF THE STOMACH IN EARLY LIFE,

AND THE VALUE OF CELLS IN EFFUSIONS IN THE DIAGNOSIS OF CANCER OF THE SEROUS MEMBRANES.[1]

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C. McK., aged twenty years, farmer, born in Michigan, was admitted to the University Hospital October 21, 1896. He complained of an "obstruction in the gullet," pain in the epigastrium, between the shoulders and in the small of the back.

History. The family history is negative as to new-growth and tuberculosis. The father (aged seventy-five years) and mother (aged fifty-three years) are alive and well. There are four brothers and four sisters living and well.

The patient was well up to October, 1895, not having had the common diseases of childhood. At the time given he had a pain in the epigastrium and the lower part of the thorax, so severe as to cause him to

[1] Read before the Association of American Physicians at the meeting in Washington, May 4-6, 1897.

" double up." At the same time there was a choking sensation in the throat, and a good deal of mucus was raised. A week later difficulty in swallowing was noticed. The food seemed to stop in the throat, and an effort was required to pass it down. This persisted to the present time. Frequently the food comes up with some force as soon as swallowed. For some time it has been impossible to swallow solid food, except after careful mastication. The patient denies actual vomiting; says he has never vomited blood. For the first six months there were almost daily attacks of " cramp " in the epigastrium. In February the patient had measles. This left him weak, and he was unable to walk for three weeks. In March the abdomen began to enlarge. Much flatus was passed; the bowels were constipated. After that the patient improved, gaining strength; but in August he again became weak. Two weeks before admission the legs began to swell. From the beginning of the disease the patient had to pass water two or three times at night. During the last two weeks the quantity of urine has diminished.

The appetite is good. The bowels are very constipated; sometimes there is no stool for two weeks.

Present condition, October 23, 1896: slender frame, of medium size; extreme emaciation; skin dry, harsh, very pale, as are also the visible mucous membranes. No jaundice; no cyanosis. There is œdema of the legs, the dependent parts of the thighs, and in the back from the sacrum to the lower dorsal region. The œdema is soft, the skin over it glossy. The nails are curved, but the fingers not clubbed.

The mind is clear; the voice weak. The special senses are normal; the eyes lustreless; expression weary. The tongue is small, smooth for the most part, but with irregular, elevated white patches on the middle and sides. The gums are red and slightly ulcerated.

The lymph-nodules in the supraclavicular regions are slightly enlarged.

The thorax is long, narrow, and flat; the expansion slight, but symmetrical. Percussion of the upper parts of the thorax alike on both sides. In front the note is short and high pitched. In the back dulness begins on the line of the ninth dorsal spine on both sides. Auscultation reveals weak vesicular breathing all over, with no adventitious sounds. In the dorsal position the liver-dulness cannot be made out. On sitting up dulness is encountered on the fifth rib in the nipple-line, moving freely with respiration. An inch lower down tympanitic resonance is obtained.

In the left axillary line stomach tympany is found on the fifth rib.

The apex-beat is in the fourth interspace one cm. inside the nipple-line. Heart dulness begins in the third intercostal space, extends from the left edge of the sternum within a centimetre of the nipple. The sounds at the apex are weak but clear. The second pulmonary sound is accentuated. The radial pulse is small, soft, regular.

The abdomen is much distended, measuring thirty inches at the umbilicus. There is tympanitic resonance all over the front to within three finger-breadths of the os pubis. The right flank is tympanitic. In the left flank there is dulness up to the anterior axillary line. On sitting, dulness reaches to the umbilicus. There is fluctuation. Palpation of the abdomen negative, the walls being extremely tense.

The splenic dulness, when the patient lies on the right side, is found in the normal position, measuring four by two centimetres.

Examination of the pharynx negative. A soft stomach-tube, 1.1 cm.

in diameter, is swallowed easily for 39 cm. (from the upper incisors), but cannot be passed further. The tube shows no remains of food on withdrawal. [Patient has been on milk-diet since yesterday.] Larger olive tips on whalebone stem cannot be passed beyond the point mentioned, but one 9.5 mm. in diameter goes through after passing a firm but elastic obstruction behind, at the distance mentioned, measured on the stem. On account of the obstruction and the patient's cachexia no effort was made to test the stomach digestion.

Temperature since admission has been between 97.8° and 99° F.; pulse 90 to 104; respiration 20 to 24.

Urine (sample) turbid with urates, contains no albumin nor albumose, nor sugar; diazo-reaction negative. Sediment negative.

October 24. The patient has had no new symptoms. Has taken in the last twenty-four hours twenty ounces of milk. Weight 108 pounds. Aspirated ascites with small syringe, removing 10 c.cm. of yellow, opaque alkaline fluid. Heat and nitric acid cause a large yellow precipitate. Acetic acid in excess causes a faint increase of the turbidity, and the addition of potassium ferrocyanide throws down a firm coagulum. Fehling's test negative. Solution of caustic soda clears up turbidity slightly, increased by the addition of ether, but ether alone produces no change.

A small sediment obtained by centrifugalization shows numerous round or oval cells two to four times the diameter of a red blood-corpuscle, some much larger, very few small cells, and red blood-cells. The larger cells contain numerous bright granules, and some of them vacuoles, either one or many small ones or one large one, giving the cell a ring shape, with the nucleus more or less compressed.

No tubercle bacilli could be found.

[A guinea-pig inoculated remained free from tuberculosis.]

Blood examination. Blood flows freely, thin and somewhat pale. Red blood-corpuscles 3,230,000. Leucocytes 6200. Hæmoglobin (Gowers) 40 per cent. Differential count (1030 cells): small lymphocytes, 3.8; large lymphocytes and mononuclear, 13.8; multinuclear, 80.5; eosinophile, 0.48; degenerate, 1.1.

Punctured with a trocar above the pubes, removing 4700 c.cm. of fluid. The fluid is bright yellow; opaque; specific gravity 1010; alkaline. Albumin (dry by weight, after coagulating with heat and acetic acid, washing with large quantities of water, alcohol, and ether), 3.8 per cent. Biuret-test, after removal of albumin, negative. Bile coloring-matter test (fuming nitric acid) negative. Fehling's test negative. Diastase test negative. On extracting 100 c.cm. with ether, after the addition of caustic-soda solution, a few small drops of yellow oil are obtained. Prolonged centrifugalization does not clear up the fluid nor produce a fat layer. On standing over night in a 250 c.cm. cylinder a white layer forms 3 mm. thick, which under the microscope shows small oily-looking globules soluble in ether.

The centrifuge brings down numerous cells such as were obtained before. These contain many bright granules and vacuoles of various sizes. Soda solution does not dissolve the granules at once, but after remaining in ether and alcohol half an hour nearly all the granules disappear. Acetic acid clears up the bodies of the cells and makes the nucleus distinct, but does not affect the granules. Iodine solution stains the nuclei and protoplasm as usual, but does not show the

so-called glycogen reaction (either in fresh or dried preparations). Methylene-blue in watery solution added to the fresh sediment stains the nuclei, as in dried preparations.

The cells were spread on cover-glasses, dried in the air and fixed with ether and absolute alcohol, formol vapor and solution, heat, picric acid, and sublimate. Stained in various ways these show variations in size from 6.3 to 30 μ. The smallest, resembling small lymphocytes, are very few. About half the cells are about 15 μ in diameter, and there are many from 20 to 25 μ. Many masses containing three to twenty or more nuclei can be seen, in which neither acids, iodine, nor stains show any separation. The protoplasm is usually pale and granular or vacuolated. The nuclei are relatively large, stain deeply, and show numerous karyo-kinetic figures. (See figures and explanation in the text.)

27th. Urine 380 c.cm.; dark red, clear, no albumin. The foam is yellow. Fuming nitric acid shows bile coloring-matter; there are a few cylindroids.

The patient feels more comfortable. The scleræ and skin show slight icterus. The abdomen is still above the level of the ribs. The superficial veins are plain, but not distended. The abdominal wall is tense. There is resonance in front to the pubes and on the right side, dulness in the left side (on which the patient lies). Palpation negative on account of tense wall. Liver-dulness from the sixth to the eighth interspaces in the nipple-line. Œdema in the back as before. The hands were swollen early this morning, but are not now.

At 1 P.M. the patient vomited immediately after eating some bread and milk.

There is diminished resonance in the back below the left scapula, with diminished breath-sounds and vocal fremitus. Aspirated in the ninth interspace at the angle of the scapula, withdrawing 10 c.cm. of clear yellow fluid. This contains cells like those in the peritoneum.

28th. Urine 450 c.cm.; specific gravity 1023; dark green with yellow foam; marked bile-color reaction. Sediment contains hyaline casts, sometimes with yellow granules.

The jaundice as before. Liver-dulness from the fifth to the seventh interspace in the nipple-line. Abdomen tense as before. The heart is not displaced. The dulness in the left back as before; the half-moon shaped space is clear. Vomited a little mucus.

November 2. Urine 1100; specific gravity 1023; dark yellow. No albumin nor sugar. Diazo-test positive. Sediment negative. Weight 96 pounds. Patient has not vomited since the 28th. Eats a little bread and milk, corn-bread and beef-broth.

The heart is not displaced. On the left, behind, there is dulness from the fourth dorsal spine, the upper line extending down and toward the front to the ninth interspace in the middle axillary line, where there is tympanitic resonance.

In the right, posteriorly, there is dulness from the ninth spinous process to the seventh interspace in the axilla, sloping down to the liver-dulness in the mammary line. Breath-sounds and fremitus absent over areas of dulness.

Aspirated in the seventh interspace in the left axilla, obtaining 430 c.cm. of dark yellow fluid, specific gravity 1012. The foam is yellow; bile-test positive. Aspirated in the seventh interspace below the right scapula, withdrawing 220 c.cm. of paler yellow fluid, also of

specific gravity 1012. Foam white; bile-test negative. On both sides the lung could be felt as a hard body coming against the needle.

The patient, declining to remain longer in the hospital, passed under the care of my friend, Dr. P. J. Livingstone, of Caro, Mich.

The diagnosis, as given in a clinical lecture, was malignant disease, probably cancer, of the peritoneum, lungs and pleuræ, with growths either in the wall of the stomach, including the cardiac end, or else in the tissues behind it, and pressing on it; also growths pressing on the bile-ducts. The primary seat was left in doubt. The absence of definite symptoms on the part of the stomach, intestines, pancreas, and other abdominal organs made it impossible to assign the primary seat to one of them. The impossibility of examining the stomach-digestion made accurate investigation of that organ impossible. The age made it most probable the disease was primary in the intestine. Primary so-called endothelioma of the peritoneum and pleura was considered, and also a primary growth in the retroperitoneal tissue. Tuberculosis was excluded on account of the low specific gravity of the fluid and the character of the cells. A primary growth of the œsophagus or cardia was excluded.

About a week after leaving the hospital the patient died, and Dr. Livingstone obtained an autopsy. Unfortunately, an accident early in the operation compelled Dr. Livingstone to leave and prevented a complete examination, as also the obtaining of much material. Dr. Livingstone writes that the wall of the stomach was thickened all over and so retracted that its capacity was not more than twelve ounces. The thickness extended to the œsophageal opening, and was especially marked along the greater curvature. Around the cardiac end were large adherent masses of carcinomatous lymph-nodules. The pylorus was almost entirely closed. The omentum was thickened and rolled up. The intestines were involved in a mass of adhesions with the enlarged mesenteric glands. The pancreas was also involved in the new growth. The rectum and bladder were free. The right pleura was adherent to the lower half of the lower lobe of the lung. The latter was of the color and consistence of liver. The pericardium and heart were not affected. The various body-cavities contained, together, five or six quarts of fluid. There was marked jaundice.

Questions in regard to the left pleura and the diaphragm could not be answered. The only tissues saved were a section of the pyloric end of the stomach, the gall-bladder with a bit of liver, and the right kidney and adrenal with peritoneum.

The pylorus has a small ulcer extending into the submucosa. The mucous membrane around the ulcer is thickened and with the submucosa measures 5 mm. in depth. The muscularis is 3 mm. thick. Continuous with this is a firm cancerous mass 1.5 cm. thick. Four cm. from the pylorus the mucosa is 1.5 mm. thick, the submucosa 5 mm., and the muscularis 1–1.5 mm.

The gall-bladder is retracted in all directions, being 2 cm. in diameter in the widest part. The surface is covered with small yellow nodules.

The wall is from 1 to 4 mm. thick. The cavity is filled with thick white mucus. In the wall of the cystic duct, just beyond the gall-bladder, is a soft, white, roundish mass 3 mm. in diameter. Just beyond this is another mass, 1.5 cm. in diameter, obliterating the lumen in that part. Further down is a carcinomatous lymph-nodule, and beside this an infiltration which passes into the liver, with the veins. The peritoneum over the kidney and adrenal is from 2.5 to 5 mm. thick, filled with yellowish nodules or coalescent masses of considerable size.

Microscopical examination. Pylorus: the ulcer mentioned above extends into a scirrhous mass. The remains of the mucosa show for the most part a granulation-tissue filled with large cells with deeply staining irregular nuclei. Tubules are rare. The cells in them usually grow irregularly, filling the lumen. At the bottom of the mucosa are long oval alveoli, lined by irregular cylinder-cells, the deeply staining nuclei of which are toward the walls of the alveoli. A few nuclei show traces of karyokinetic figures. There is no basement-membrane in these alveoli. The walls of the alveoli are made up of connective tissue with few long and narrow nuclei, and are sparsely infiltrated with small round cells. The submucosa contains a few small alveoli lined with polymorphous cells, but for the most part shows an extensive infiltration with shrunken cells in small spaces. In the muscularis are large areas filled with cells which have large, pale vesicular nuclei and very little protoplasm. These spaces sometimes show very thin lines of connective tissue traversing them in various directions, so forming alveoli. Beneath the muscularis are large and small alveoli, the walls of which are of dense connective tissue. They contain atrophic cells.

Near the pylorus the mucosa is still cancerous. The tubules do not show, but are replaced by a granulation-tissue containing epithelial, small, round and multinuclear cells and long spindle-cells. At the bottom of the mucosa are irregular alveoli, lined with irregular or cylindrical cells in a single or double layer, or irregularly filling the lumen. Cells with small nuclei and swollen protoplasm of fine granular or homogeneous appearance are sometimes present in the alveoli. Some of the alveoli are lined by long cylinder cells with small, crescent-shaped nuclei close to the wall. The muscularis mucosæ here contains many alveoli, some of them passing through its whole width, of irregular outline. These are lined with a single layer of cylinder-cells, or more frequently are filled with irregular cells. Just below the muscularis mucosæ are alveoli filled with cells. These have deeply stained nuclei and a large amount of protoplasm, with round or oval outlines. The cells lie close together, so that the boundaries can only be seen by careful illumination and focussing. The cells are retracted from the walls of the alveoli. In some alveoli all the cells have relatively small nuclei and clear, swollen bodies. There are areas of multinuclear cell-infiltration in the submucosa, and extensive large-celled infiltration in the lymph-spaces. The muscular fibres are separated by alveoli filled with epithelial cells, with thin septa in the larger alveoli. There are also a few alveoli lined with a single layer of cylindrical or cubical cells and containing mucus-looking material in the centre. Just beneath the peritoneum are alveoli lined with cubical cells. A few free cells in the alveoli show mucous degeneration. In some the nuclei show evidences of recent cell-division. Furthest away from the pylorus the mucosa shows tubules for the most part of normal appearance, though the cells

are, as a rule, more advanced in mucous degeneration than in a healthy stomach. In a few tubules the cells stain unusually deeply. This is seen especially at the bottoms of the tubules, and in some cases these tubules are prolonged through the muscularis mucosæ. The submucosa and muscularis show cancerous change similar to that in other parts already described.

The wall of the gall-bladder contains numerous small alveoli just beneath the serosa. The large mass described is a carcinomatous focus containing alveoli with very thin septa, and with cells resembling those of the other parts already described. The folds of the mucous membrane of the gall-bladder and cystic duct are filled with cancer alveoli. There are also foci of small-celled infiltration. The cancerous tissue passes into the liver along with the large vessels, and is found, also, in portal areas, some distance from the surface.

The peritoneum over the right kidney and adrenal contains large alveoli filled with the characteristic cells. There is also much small-celled infiltration. The veins of the peritoneum are much distended.

This was evidently a case of cancer of the stomach primarily. That the disease began in the pylorus is impossible to prove, though highly probable. At all events, widespread infiltration or multiple new growths occurred, so that the whole stomach-wall was early involved, followed later by metastasis in the peritoneum and pleuræ.

This view is based on the character of the growths and their distribution. It is hardly necessary to exclude a primary so-called endothelioma of the peritoneum, as the growths here do not go out from the endothelial cells, as in the other disease. The early infiltration of the whole wall gave the local disease the character of a latent cancer, while the affection of the cardia produced the striking symptom of obstruction there.

The case presents two aspects of especial interest: the youth of the patient and the physical and microscopic characteristics of the fluid in the peritoneum and pleuræ.

AGE. It is not necessary to speak at length on the first point. Since the publication of Mathieu's[1] classical article, in 1884, it has been admitted more generally than before that cancer of the stomach can occur before the age of forty or even thirty, once looked on as the earliest possible periods. A number of cases have been reported by trustworthy observers. Many are published in so casual a way that enumeration and analysis are out of the question. One fact of importance that seems to be demonstrated by recent observations is that cancer of the stomach in early life often has a slow course. This was brought out when, in the Société médicale des Hôpitaux, March 10, 1895,[2] Mathieu reported the case of a man of twenty-five years, who died of cancer of the stomach, whose symptoms began three years before. Catrin men-

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[1] Mathieu, Marc: Du cancer précoce de l'estomac. Paris, 1884.

[2] La Semaine médicale, 1895, p. 225.

tioned another case lasting two or three years. Ferrand spoke of a case with slow development in a young girl, but the diagnosis was not so positively made as in the others. [Puncture of the enlarged liver withdrew a "juice manifestly cancerous."]

The present is the second case of gastric cancer in early life I have seen in which a positive diagnosis was made. In the other case there were classical symptoms in a woman of twenty-four years. A year later my colleague, Dr. B. E. Hadra, operated on account of complete obstruction of the pylorus, and we found the disease (scirrhus) limited to a ring including the pylorus, and only six centimetres wide at the widest part. There was no evidence of cancer in the lymph-nodules removed with the mass.[1] The matter of slow course is important because of the growing and proper tendency to look on cancer of the stomach as a surgical disease. It would be permissible to make a bolder attempt at complete extirpation of all diseased parts in a young person than in the usual subjects of gastric cancer.

It is hardly necessary to speak of the diagnosis of cancer of the stomach in early life, except to repeat the remark of Boas that the diagnosis is difficult because in young subjects cancer of the intestine is more frequent. Of course, in youth, as later, the cancer may be latent, or there may be early involvement of the whole wall, so obscuring the diagnosis or making it difficult.

THE EFFUSION. The transudate in the case now reported belongs to the fatty variety, the peculiarities and causes of which were first accurately shown by Quincke.[2] In the present case the milky appearance was due to fatty degenerated cells and free fat-globules from those cells. As this can occur in conditions so different as tuberculosis and cancer it evidently has only limited diagnostic value.[3]

The low specific gravity of the fluid, as in my case, is usually looked on as characteristic of cancerous as distinguished from tuberculous exudates. The latter are usually of high specific gravity—from 1022 to 1025, in my experience. But sometimes a cancerous effusion has a high specific gravity. In a case of carcinoma of the pleura secondary to one of the stomach, with fatty fluid, Bögehold[4] found the specific gravity of the fluid was 1021 to 1023. [There was considerable free

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[1] Since this paper was written I have received the report of the post-mortem examination, confirming the diagnosis made in another case in my clinic, in a woman of twenty-one years. Symptoms were present nine months; tumor was discovered six months before death. Operation was declined. Cancer of the pylorus was found, apparently without metastases.

[2] Ueber fetthaltige Transudate. Hydrops chylosus und Hydrops adiposus. Deutsches Archiv für klin. Med., Bd. 16, p. 121.

[3] As the quantity of fat extracted with ether was so small it is possible the opacity was due in part to some other substance than fat. Rotmann, in a valuable article (Zeitschrift für klin. Med., Band xxxi. p. 438) quotes G. Lion, who found a casein-like substance as the cause of a milky ascites. Hammersten in a similar fluid found a mucoid body.

[4] Berlin. klin. Wochenschrift, 1873, No. 24, p. 347.

blood in this fluid.] Quincke, in two cases of cancerous fatty ascites, also found a specific gravity of 1023. On the other hand, in tuberculous ascites the specific gravity may be as low as 1015. So the specific gravity of effusions must be used with caution in diagnosis.

THE CELLS. For the last fifty years the belief in a characteristic cancer-cell has slowly changed as objective criticism stripped away each attribute thought to be peculiar. At present there is little left but the unfulfilled hope that a cell-parasite may be found, by the recognition of which we may distinguish cancer-cells from others. Peculiarities of form or size, the presence of vacuoles, especially of large vacuoles, fat-granule-cells (especially these last two when in considerable number), cells containing glycogen, have all been abandoned on account of the uncertainty accompanying their application. So careful a clinician as Eichhorst still makes use of some of these things, however. In the latest edition of his *Lehrbuch der klin. Untersuchungsmethoden*, Berlin, 1896, he says, " Especially in cancer of the pleura we find in the exudate, not rarely, abundant fatty-granule cells and cells with multiple nuclei, which are characteristic of cancer." Geigel and Voit speak with more caution, but much to the same effect (*Lehrbuch der klin. Untersuchungsmethoden*, Stuttgart, 1895). But most observers hold that only the recognition of distinct tumor-particles can be used in making a diagnosis of new growth of the serous membranes. The finding of such particles is, of course, not common. It was, therefore, a matter of great interest when Rieder[1] reported a case in which he made a diagnosis of malignant disease of the peritoneum and pleura from finding numerous cells in the exudates showing indirect nuclear division. The patient was a woman of forty years. " Section showed sarcoma (carcinoma?) of the peritoneum, probably secondary to malignant disease of the ovaries." In the fluids obtained during life cells were found which were remarkable " in the first place, on account of the differences in size and shape of the individual cells. Often there were indentations and constrictions, sometimes buddings. In many cells there were one or many vacuoles, often so large that the nucleus was pushed to one side, sometimes hardly visible. The nuclei varied in size and number." The examination of the stained cells showed large numbers of cells showing indirect division, and especially cells with atypical mitoses.

Rieder fully described and accurately figured these cells. His description should be consulted in the original by those interested, being too detailed for quotation here. I have found some interesting forms that he did not, and, on the other hand, he describes some forms I did not get to see. Thus, I did not see such beautiful multilobed cells as he shows, but I seem to have seen more of the atypical mitoses.

[1] Deutsches Archiv für klin. Med., Bd. liv. H. 6, p. 544.

Incited by the excellent article of Rieder, I began to examine exudates and transudates more carefully than before, but the case now reported was the first one I encountered in which I obtained positive results. Other cases examined in the meantime were non-malignant.

I proceed to a description of the cells. After fixing, the preparations were stained in various ways. The best results were obtained by the use of dilute hematoxylin solutions, especially after hardening in picric acid.

Cells having the size and appearance of lymphocytes are but rarely found (Fig. 16). Multinuclear leucocytes are also very uncommon. The fatty-granule cells that were so numerous in the fresh sediment appear after fixing as in Figs. 17 and 18. In these the nucleus stains with moderate intensity. It is usually finely granular or striated, sometimes shows a fine network, and rarely a nucleolus. The nucleus in these, as in other cells, sometimes contains small vacuoles (Fig. 23). The protoplasm is either finely granular or homogeneous, or, in cells suitably fixed, shows the fatty granules. The protoplasm does not take eosin well; with Ehrlich's neutrophile mixture it shows very fine neutrophile granules thickly filling the cell. [In the figures the protoplasm has been shaded without any attempt at a reproduction of the structure.] The vacuoles show well in stained preparations. They do not give the microchemic reaction for mucin with thionin or hematoxylin. They rarely reach a size larger than $25\,\mu$ in diameter, and vacuolated cells such as Quincke and others describe, 100 to $120\,\mu$ in diameter, I did not find at all. There are many bodies looking like giant-cells or aggregations of cells. Some are undoubtedly single cells with many nuclei, and I show some of the smaller ones in Figs. 24–30, 43–45. Others contain as many as twenty nuclei, but it is not possible to be certain these are not small cell-nests. However, in the fresh sediment they could not be separated by pressure on the cover-glass, nor could any boundaries be shown by silver nitrate. The latter test, however, on cover-glass preparations is very uncertain. The cells shown in Figs. 21 and 39 show incomplete division of the protoplasm. Occasionally cells showing a similar condition with three or four parts can be found.

The most remarkable feature of the sediment is presented by the great number of karyokinetic figures. These are especially common in cells from 12 to $18\,\mu$ in diameter. The protoplasm of these cells is usually more homogeneous than that of others. Vacuoles sometimes occur, and in rare cases the protoplasm may be very much degenerated. Mitoses are so numerous that every field contains one or more. Often two to five can be seen in a small field. Various stages of nuclear and cell division are present. The most common is that of the equatorial plate, as shown in Figs. 5, 6, 11, 15, 21, 27, etc. The spireme (Figs. 9 and 26) and the monaster (Figs. 24 and 44) are uncommon. The meta-

0.100mm
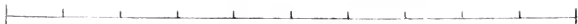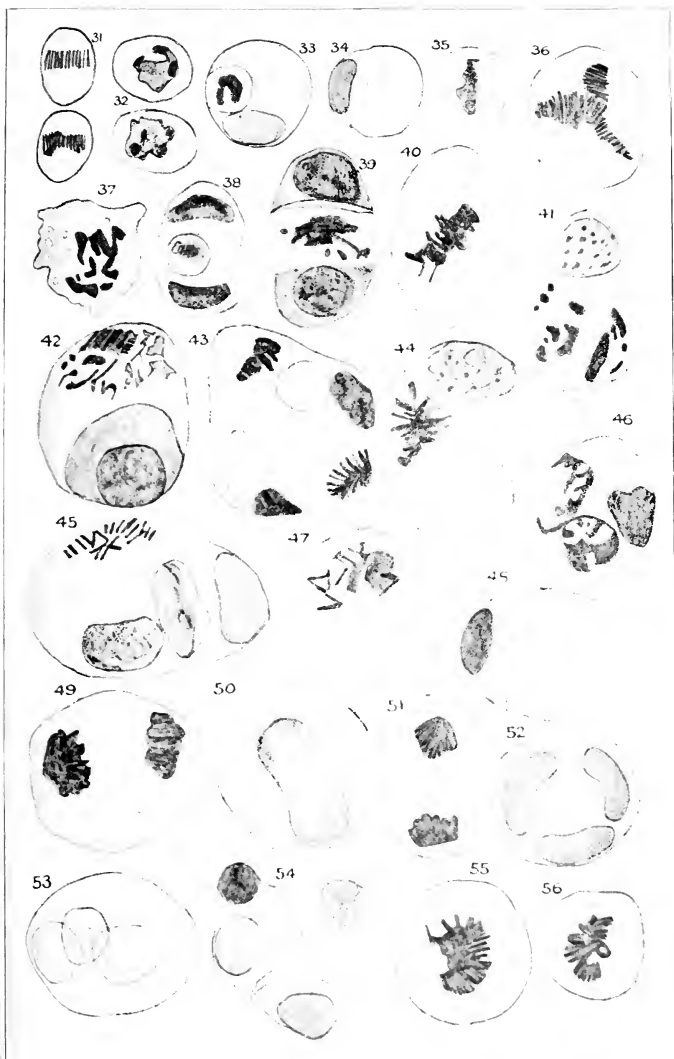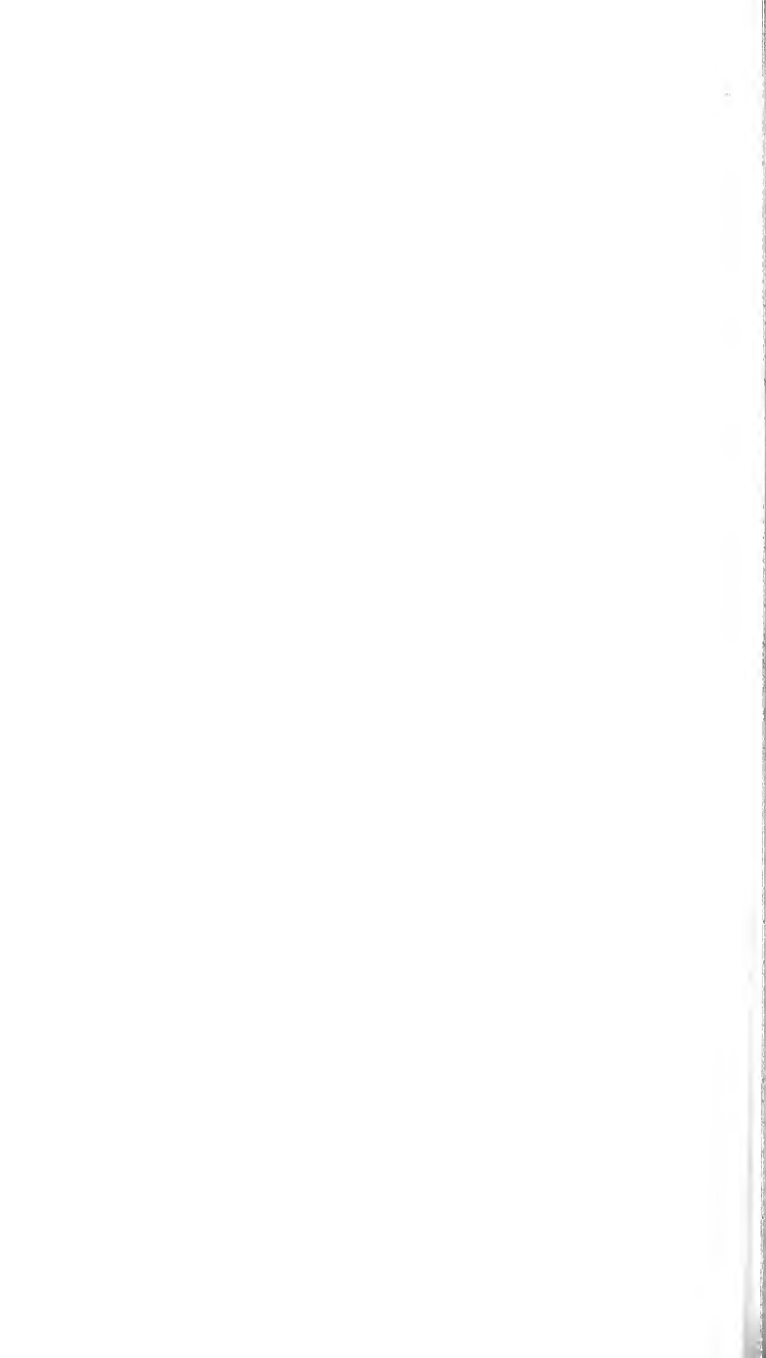
phase is not so easily recognizable, partly on account of the obscurity of many of the figures, but is well shown in Fig. 29. The anaphase is common, as in Figs. 1–4, 8, etc. The chromatic figures in about half the examples are fairly typical, or show such modifications of size and shape of the chromosomes as can be explained by slight alterations or the mode of preparation of the specimen. Chromatic figures are also found in larger cells, but having the same kind of protoplasm as the smaller one just mentioned, and hence not enlarged as the result of degeneration. These reach a diameter of 28 μ. Cells of all sizes, but especially the larger ones, sometimes show atypical mitoses. Thus, Figs. 14 and 36 show tripolar nuclei. The nuclei in Figs. 12 and 13 may be atypical, but in the absence of polar bodies and achromatic figures they are difficult to interpret.

Cells containing more than one nucleus, and with the nuclei in different stages, are also common. Some of these are shown in Figs. 20–27, 39, 41–45. Many other varieties of these could be given. In these cells one or more of the nuclei are in the resting stage, and one or sometimes more in various stages of indirect division and sometimes showing an atypical figure. The cells in the pleural transudate resemble in all respects those found in the peritoneum, as a few figures will show (Figs. 31–45).

The mitoses found, so far as they can be studied by the chromatin alone, show all the common abnormalities. Thus we find hyper- and hypochromatic nuclei, the latter being rare. Giant mitosis may be represented by the tripolar figure in Fig. 14. Asymmetrical mitosis is not easy to recognize on account of the imperfect preservation of the chromosomes in many cases. The examples of mitosis in multinuclear cells resemble often the figures given by Krompecher.[1]

The finding of the mitotic figures in the ascitic and pleural fluids may be considered from two separate aspects, viz., the great number of these in the first place, and the presence of atypical forms in the other. I shall consider the last first.

The interesting history of atypical mitosis can only be touched on here. Eberth[2] was the first to describe division into four parts, but his statements were at first discredited by Flemming and Strassburger. Later, however, Arnold[3] found multiple karyokinesis in carcinoma. He thought the process might result in the production of polynuclear cells. Since then a great deal of work has been done on the subject, much of it being excited by the ingenious speculations of Hansemann. From an examination of the work done so far it appears that atypical mitoses are found in various pathological conditions, not only in new

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[1] Ueber die Mitose mehrkerniger Zellen und die Beziehung zwischen Mitose und Amitose. Arch. für path. Anat., Bd. cxlii. p. 447.

[2] Archiv für path. Anat. und Physiol. Bd. lxvii.　　　　　　[3] Ibid., Bd. lxxxiii.

growths like cancer and sarcoma, but also in benign tumors and in regenerations; in short, " in all tissues of strong reproductive activity and when there is active mitosis (Ströbe)." They are also found in tissues irritated by various poisons, such as quinine, chloral, nicotine, etc., or in tissues exposed to high temperature (Galeotti). In cancer all observers find them in great richness and variety, but the view that the presence of even a large number of pathological mitoses in a tissue justifies the diagnosis of cancer is gradually being abandoned.[1]

As regards the occurrence and importance of mitotic figures in exudates and transudates, I can find nothing in the literature except the article of Rieder. I have endeavored to control his findings and my own, as far as I was able, by examining other similar fluids in the same way. The results are interesting, but, of course, much more research is still necessary.

I find that in ordinary serous effusions, as in serous pleurisy and tubercular peritonitis, the large majority of cells are multinuclear leucocytes. There are also few or many small cells having the characteristics of lymphocytes, a few larger, mononuclear, cells usually with small vesicular nuclei, and in some cases fibroblasts. My examinations in such fluids, therefore, give the same results as were obtained by E. Grawitz[2] in his investigations on the formed constituents of pleural exudates. Cells like the smaller forms in mitosis in my own case are not found in such exudates. The larger cells in my case do not have their counterparts in ordinary exudates. As I surmised they might be endothelial cells from the peritoneum and pleura, I obtained bits of the former tissue at operations on the abdomen, made cover-glass preparations of scrapings, and examined these after treating them as I had the sediments. In this way, from normal peritoneum and from the apparently normal peritoneum in tuberculosis of that membrane, cells may be obtained which resemble in form, size, and structure of nucleus and protoplasm the larger cells in my case of cancer, but without mitoses. From the inflamed appendix vermiformis I obtained similar cells, also with resting nuclei, but the cells on inflamed surfaces are often smaller than those from similar parts in health. From the normal serosa I obtained cells apparently showing amitotic division. These are more numerous on the inflamed peritoneum or pleura, and I figure one of the

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[1] Although I have not thought it necessary to give a detailed review of the subject of atypical mitosis, I should add that a study of the literature will be very helpful to those who wish to make investigations in effusions. As all the literature is quoted in the indispensable works of Hansemann (Arch. für path. Anat., Bd. cxix. p. 299, Bd. cxxiii. p. 356, Bd. cxxix. p. 436; Studien über die Spezificität, den Altruismus und die Anaplasie der Zellen. Berlin, 1893), Ströbe (Beiträge zur path. Anat., Bd. xi., xiv.), Cornil (Journal de l'Anat. et de la Physiol. norm. et path., 1891, t. xxvii. p. 97), and Galeotti (Beiträge zur path. Anat., Bd. xiv., xx.) it is not necessary to give a complete bibliography here.

[2] Charité-Annalen, xviii. Jahr., p. 265.

most striking examples (Fig. 50) from the latter. Several similar specimens, as also some showing later stages, were seen.

In two cases I found cells more like the peculiar forms in my case of cancer.

One of these was a woman of fifty years. A cancerous mamma, with extensive metastases in the axilla, had been removed. A few days after the operation effusions came on in both pleural cavities, with adhesive pericarditis. Femoral phlebitis then developed, apparently from an old leg ulcer, and about two weeks after the operation the patient died. The pleural effusion was examined the second day after it began—i. e., after the disappearance of friction. It was turbid, contained an excess of red blood-cells and lymphocytes, large numbers of multinuclear and a few endothelial cells. The latter showed fatty degeneration, breaking down of the protoplasm, with the formation of small blebs on the edges, and small and large vacuoles. Many of the large cells contained multinuclear cells in vacuoles, a process seen very rarely in the case of McK. (Fig. 33). Some of the larger cells contained two or three or more nuclei in the resting stage. Some of these cells showed partial division of the protoplasm (Fig. 54). Besides these there were a few cells, about two or three in each preparation, showing karyokinesis. These cells are from 20 to 25 μ in diameter, and resemble the larger forms found in the case of McK. The figures are fairly typical, the chromosomes preserved better than in McK. (Figs. 55, 56.)

The body of this patient was examined post mortem by Dr. A. S. Warthin. He found under the pulmonary pleura a few small, puckered nodules. To the naked eye the pleura was intact. Microscopic examination showed these to be small-celled scirrhous foci immediately beneath the pleura, the latter being intact.

In another case pleurisy developed in a young man some weeks after removal of a diseased appendix. Symptoms previous to the appearance of the pleurisy made it seem probable there was a subphrenic abscess, but as the patient left the hospital before death the exact relations could not be made out. The fluid from the pleura was slightly turbid, specific gravity 1024, and gave a growth of streptococci. It contained large numbers of pus-cells and red blood-corpuscles; many small endothelial cells up to 18 μ in diameter, with well-preserved protoplasm; larger cells up to 30 μ in diameter having normal protoplasm; most of these larger cells contain either two or more nuclei in the resting stage (Figs. 52, 53), or a single nucleus in direct division (Fig. 50); a few of the smaller specimens (20 μ in diameter) show karyokinetic figures, but the larger ones (25–30 μ) are found with them more frequently (Figs. 46, 47, 49, 51). Finally, there are cells with the protoplasm occupied by a single large vacuole, the nucleus usually pressed to one side (Fig. 48). These cells measure as much as 55 μ. The nuclear

figures are sometimes difficult to interpret, but, on the whole, are more regular than those of McK.

It seems, then, from the few cases examined, there are more cells showing mitosis in cancerous effusions than in those of simple or tuberculous inflammation. There may also be many atypical mitoses in the former case. The examination of the last case mentioned shows that the differences are quantitative and not qualitative. This is what we should expect from the knowledge we have of karyokinesis, normal and pathological, in tissues. From the results obtained by Rieder and myself it should often be possible to make a diagnosis, especially between cancer and tuberculosis of a serous membrane, by an examination of the cells in effusions. The results in the last case show that all other differences are less reliable than this one. I do not speak of inoculations. Aside from risk of failure, the element of time may be important.

It is interesting to speculate on the origin of the larger cells found. These can hardly be other than endothelial. In Rieder's case and my own such cells are often in mitosis. This would seem to be the result of an irritation of the serous membrane, but an irritation that is not peculiar to malignant new growths, as my last case shows. We cannot, therefore, hope to determine the precise histological character of a growth on such a membrane from isolated cells from it. The fact is interesting in connection with the old view that in cancer of serous membranes the cells of the latter become infected, and so take part in the new growth, an idea of course now abandoned.

In all my cases I have examined the fresh sediment for possible parasites, hoping that a considerable experience with many parasitic protozoa would be of assistance. I could see nothing, however, suggesting such organisms. I looked with especial interest for the *Leydenia gemmipara*, described by Schaudinn in cases of cancerous ascites, but without success. In stained preparations inclusions are not uncommon, but nowhere do they suggest definite forms of parasitic organisms.

Explanation of the figures: All the cells were drawn with the camera lucida, using a Zeiss one-twelfth inch oil-immersion objective, No. 2 eye-piece. The scale is shown on Plate 1 by 0.100 mm. drawn from a standard scale under the same conditions. The outlines of the cells and nuclei are as accurate as possible. Peculiarities of the protoplasm have not been reproduced, in order to avoid confusing the picture.

Figs. 1–30 are from ascitic fluid in the case of McK.; Figs. 31–45 from the pleuræ in the same case. Figs. 46–53 are from pleurisy following appendix operation. Figs. 54–56 are from terminal pleurisy in a case of subpleural carcinoma of very limited extent. Further description of the cells is given in the text.

S. D. Gross.

ADDRESS ON THE UNVEILING OF THE BRONZE STATUE OF THE LATE PROFESSOR SAMUEL DAVID GROSS, IN WASHINGTON, D.C.

By WILLIAM W. KEEN, M.D., LL.D.,

PROFESSOR OF THE PRINCIPLES OF SURGERY AND OF CLINICAL SURGERY IN THE JEFFERSON MEDICAL COLLEGE, PHILADELPHIA, PA.

FELLOWS OF THE AMERICAN SURGICAL ASSOCIATION; MEMBERS OF THE ALUMNI ASSOCIATION OF THE JEFFERSON MEDICAL COLLEGE, AND FRIENDS: Go with me, your spokesman, to-day to the Woodlands Cemetery—that "God's Acre" or "Court of Peace," as the Germans so poetically call it—which holds the dust of so many of the best dead of Philadelphia. Upon an urn there treasured you will read the following:

IN MEMORIAM.

Within this urn lie the ashes of

SAMUEL D. GROSS,

A Master in Surgery.

His life, which neared the extreme limits of the Psalmist, was one unbroken process of laborious years.

He filled chairs in four Medical Colleges, in as many States of the Union, and added lustre to them all.

He recast Surgical Science, as taught in North America, formulated anew its principles, enlarged its domain, added to its art, and imparted fresh impetus to its study.

He composed many Books and among them

A SYSTEM OF SURGERY,

Which is read in different tongues, wherever the Healing Art is practised.

With a great intellect, carefully trained and balanced, he aimed with undivided zeal at the noble end of lessening human suffering and lengthening human life, and so rose to the highest position yet attained in science by any of his countrymen.

Resolute in truth, he had no fear; yet he was both tolerant and charitable.

Living in enlightened fellowship with all laborers in the world of Science, he was greatly honored by the learned in foreign lands, and deeply loved at home.

Behind the Veil of This Life There is a Mystery Which He

Penetrated on the

SIXTH DAY OF MAY, 1884.

HIS MEMORY

Shall exhort and his Example shall encourage and persuade those who come after him to emulate deeds which, great in themselves, were all crowned by the milk-white flower of

A STAINLESS LIFE.

Who and what was the man of whom this is said?

Samuel David Gross was born near Easton, Pennsylvania, July 8, 1805, and died in Philadelphia May 6, 1884, having nearly completed his seventy-ninth year.

His early years, under the wise training of a good mother, to whose memory he rightly pays a just tribute, were spent amid the rustic labors and healthful pleasures of a Pennsylvania farm. This gave him a strong and vigorous body, without which he never could have performed a tithe of the labor which pre-eminently distinguished his long life. Before he was six years old he determined to be a surgeon, and early in his professional studies to be a teacher. Yet when he was fifteen he knew scarcely any English. Brought up among the sturdy, honest, laborious Pennsylvania Dutch, he could speak that curious English-German. But his English, of which he became so fluent a master, and even pure German, which he began to study at the same time, were learned almost as foreign tongues and as a result of his appreciation at that early age of his need for a better and wider education. Even a still more striking evidence of the early development of the innate strength of his character and indomitable will is a story told in his autobiography. While a boy he became expert in playing cards; but finding he was becoming so much fascinated by them that he replayed his games in his dreams, he resolved—fancy this in a boy not yet fourteen!—to abstain from the game for twenty years—a vow he religiously fulfilled.

At seventeen he began the study of medicine as the private pupil of a country practitioner, but after learning some osteology with the aid of that tuppenny little compend, Fyfe's *Anatomy*, and a skeleton, he gave up in despair, for again he found his intellectual tools unequal to his work. The little Latin he had was insufficient, and to understand the technicalities of medicine Greek was a *sine qua non*. "This," he says, "was the turning-point of my life. . . . I had made a great discovery—a knowledge of my ignorance, and with it came a solemn determination to remedy it." Accordingly he stopped at once in his medical career and went to an academy at Wilkes-Barre. He studied especially Latin and Greek, the latter by the use of Schrevelius's lexicon, in which all the definitions were in Latin, and Ross's grammar, constructed on the same principle. But to a master will like his even such obstacles were not insuperable. To Greek and Latin, English and German, later years added also a knowledge of French and Italian.

At nineteen he began the study of medicine again—a study in which for sixty years his labors never for a moment ceased or even relaxed.

In 1828, at the age of twenty-three, he took his degree in the third class which was graduated from the Jefferson Medical College. He opened an office first in Philadelphia, but soon removed to Easton. Nothing is more characteristic of the man than that, while waiting for practice,

he spent hours daily in dissecting in a building he erected at the back of his garden, and provided himself with a subject by driving in a buggy all the way from Easton to Philadelphia and back with a gruesome companion; wrote a work on descriptive anatomy, which, however, he never published, and in eighteen months after graduation had translated and published Bayle and Hollard's *General Anatomy;* Hatin's *Obstetrics;* Hildebrand on *Typhus,* and Tavernier's *Operative Surgery*—works aggregating over eleven hundred pages. His motto was indeed *"Nulla dies sine linea."* His "stimulus," he himself says, " was his ambition and his poverty."

In 1833, five years after his graduation, he entered upon his career as a teacher—a career which continued for forty-nine years, till within two years of his death. This took him first to Cincinnati as Demonstrator of Anatomy in the Medical College of Ohio. Those of my audience who left Cincinnati yesterday will be amused to learn that by stage, canal, and primitive steamboat it took him thirteen days to reach the Queen City; and all of you will admire the pluck and courage of the young man when I add that his total worldly goods on reaching there were one hundred dollars in his purse, a wife and two children in his family, but also in his breast a heart ready to grapple with any difficulties and determined to conquer them all.

In 1835 he became Professor of Pathological Anatomy in the Cincinnati Medical College, where he was a colleague of Daniel Drake, Willard Parker, and James B. Rogers, one of the famous four brothers, with a second of whom—Robert E.—he was later a colleague in the Jefferson.

His book on the *Bones and Joints* had appeared in 1830, and next, as a result of four years' study and teaching, his *Elements of Pathological Anatomy* was published in 1839. It is strange to think that in a then small Western town in America a young teacher in a new medical school should have published the first book in the English language on Pathological Anatomy. No wonder, then, that it brought him fame and practice; that its second edition made him a member of the Imperial Royal Society in Vienna; and that, thirty years afterward, Virchow, at a dinner he gave to its then distinguished author, should show it as one of the prizes of his library.

In 1840 he went to the University of Louisville as Professor of Surgery, and, excepting one year when he was Professor of Surgery in the University of the City of New York, he remained there for sixteen years, happy in his family, his students, his flowers, and his generous hospitality. He and his colleagues—Drake and Austin Flint—soon made it the most important medical centre in the West, and he was in surgery the reigning sovereign. While there he published, in 1851, his work on the *Urinary Organs,* and in 1854 another pioneer work, that

on *Foreign Bodies in the Air Passages.* His fame had become so great that he was invited to the University of Virginia, the University of Louisiana, the University of Pennsylvania, and other schools. But he was steadfast to Louisville until his beloved Alma Mater called him to the chair just vacated by Mütter. From 1856, when in his Introductory he said, "whatever of life and of health and of strength remain to me, I hereby, in the presence of Almighty God and of this large assemblage dedicate to the cause of my Alma Mater, to the interest of medical science, and to the good of my fellow-creatures," till he resigned his chair in 1882—nay, till his death in 1884—this was absolutely true. Even when the shadows of death were thickening he corrected the proof-sheets of two papers on "Wounds of the Intestines" and "Lacerations Consequent upon Parturition," his last labors in the service of science and humanity.

Three years after he entered upon his duties at the Jefferson he published his splendid *System of Surgery*—a work which, though in many respects its pathology and its practice are now obsolete, is a mine of information, a monument of untiring labor, a text-book worthy of its author, and which has been the companion and guide of many generations of students. It was translated into several foreign tongues and passed through six editions, the last appearing only seventeen months before his death. That even when verging toward fourscore he should have been willing to throw aside all his strong prejudices and accept the then struggling principles and practice of Listerism shows the progressive character of his mind and his remarkable willingness to welcome new truths.

From his removal to Philadelphia till his death, twenty-eight years later, his life can be summed up in a few sentences : daily labor in his profession, editorial labor without cessation for some years in managing the *North American Medico-Chirurgical Review,* the successor of the Louisville *Medical Review,* of which he had also been the editor ; article after article in journals ; address after address ; twenty-six annual courses of lectures on surgery to thousands of students ; labors without ceasing till he wrapped the drapery of his couch around him and calmly passed away.

In reviewing his life we may fittingly consider it from the standpoint of the surgeon, the author, the teacher, and the man.

As a surgeon he was painstaking, thorough and careful in his investigation of a case, skilful as an operator, and, having so vast an experience and equally extensive acquaintance with the wide literature of his profession, he was scarcely ever perplexed by the most difficult case and rarely at a loss as to the proper course to pursue in the most unexpected emergencies.

He was a practitioner of the old school, who always mingled medicine

with surgery, and attributed much of his success in the latter to his experience in the former. In theory he sometimes clung to beliefs, which, in practice, he abandoned. In one of his later papers, "A Lost Art," and in his lectures, he still advocated blood-letting; but in the nearly twenty years in which as a student, an assistant in his clinic, and a quiz-master I saw much of his practice, I only remember two cases in which he actually bled his patients.

His influence on the profession was marked and wholesome. For many years he was almost always at the annual meetings of the American Medical Association and the American Surgical Association, was looked up to in both as the Nestor of the profession, and his papers and his wise words of counsel moulded both the thought and the action of his brethren to a notable degree. He founded two medical journals, was the founder of the Pathological Society of Philadelphia and of the Philadelphia Academy of Surgery, the founder and first president of the American Surgical Association, and the first president of the Alumni Association of the Jefferson Medical College. It is peculiarly fitting, therefore, that these last two associations should unite to-day in erecting and unveiling the bronze statue of one who did so much for them and whom they rightly delight to honor. All who knew his tall, manly figure and his fine face will agree that it is a speaking likeness, both in pose and feature. Could I only get a glimpse of the right hand which holds his familiar scalpel I would recognize the man. *Ex pede Herculem! Ex manu Gross!*

As an author, his chief characteristics were untiring industry, comprehensiveness, methodical treatment of his subject, and a singular felicity of style, especially for one who acquired English so late and with difficulty. In fact, through life his speech, by a slight, though not unpleasant accent, always betrayed his German descent.

He "blazed" more than one new "trail" in the forests of surgical ignorance. In the early part, and even in the middle of this century, it was rare for Americans to write medical books. The most they did was either to translate a French or a German work or to annotate an English one. He was one of the earliest to create an American medical literature of importance, and his works on the *Urinary Organs*, on *Foreign Bodies in the Air Passages*, and his text-book on *Surgery* gave a position to American surgery abroad which we can now hardly appreciate; while, as already related, his *Pathological Anatomy* was the very first work in the English language on that most important branch of medicine.

His experiments and monograph on *Wounds of the Intestines* laid the foundation for the later studies of Parkes, Senn, and other American surgeons, and have led to the modern rational and successful treatment of these then so uniformly fatal injuries. He first advocated abdom-

inal section in rupture of the bladder, the use of adhesive plaster in fractures of the legs, amputation in senile gangrene, and the immediate uniting of tendon to tendon when they were divided in an incised wound. Had he lived but a year or two longer bacteriology would have shown him that scrofula was of tubercular origin, and not, as he so firmly believed and vigorously taught, a manifestation of hereditary syphilis.

That his eminence as an author should have met with recognition from scientific organizations and institutions of learning is no cause of surprise. It made him the president of the International Medical Congress of 1876, a member of many of the scientific societies of Europe as well as of America, and won for him the LL.D. of the University of Pennsylvania, and I believe the unique honor in America of having had conferred upon him the highest degree of all three of the leading universities of Great Britain—Oxford, Cambridge, and Edinburgh. Indeed, it is both significant and pathetic to note that he laid down his pen just after recording in his autobiography the announcement of the honor which the University of Edinburgh intended to bestow upon him at its tercentenary celebration.

As a teacher, I can speak both with personal knowledge and enthusiasm. I can see his tall, stately form, his handsome face, his glowing features, his impressive gestures. He was earnestness itself. Filled to overflowing with his subject, his one desire was to impart to us as much of the knowledge he possessed as our young heads could hold. Repetition did not blunt the novelty nor time lessen the attraction of his theme. It always seemed as if he was telling us for the first time the new story of the beneficent work that surgery could do for the injured and the suffering. His whole heart was in his work. Especially did he inculcate the principles of surgery, for he was convinced, and rightly, that one who was thoroughly imbued with these could not go far wrong in his practice.

His own statement of one of the qualifications of a teacher is so true yet so often forgotten that, in spite of its mixed metaphor, I will quote it: "A teacher should be bold and decided in his opinions; not too positive, but sufficiently so to be authoritative. The student cannot judge for himself. The knowledge that is placed before him must be, so to speak, well digested for him; otherwise it will stagger and bewilder, not instruct him." His sense of the heavy responsibility of the teacher is well shown by the following from his autobiography: "Nothing was more offensive to me than applause as I entered the amphitheatre, and I never permitted it after the first lecture. I always said, 'Gentlemen, such a noise is more befitting a theatre or a circus than a temple dedicated not to Æsculapius, but to Almighty God, for the study of disease and accident, and your preparation for the great

duties of your profession. There is something awfully solemn in a profession which deals with life and death, and I desire, at the very threshold of this course of lectures, to impress upon your minds its sacred and responsible character, that you may be induced to make the best possible use of your time and conduct yourselves in a manner worthy of the dignity of Christian gentlemen.'"

The value of recitations in a medical course I fully appreciate and indorse. They will occupy in the future a much larger place in our medical schools than they now do. But I am equally convinced that such a voice, such a presence, such an impressive, earnest lecturer will never lose their powerful influence nor their place in instruction.

As a man, he was beautiful in his relations with his family, who were devoted to him with an affection that was unusually strong; upright in all his dealings, and despising cant and pretence and anything unworthy a true gentleman. Few men were more widely known in and out of the profession, and few ever had the good fortune to know intimately so many distinguished people of both continents. Wherever he was known he was respected, and by those who knew him intimately he was beloved.

Such, then, was the man whom we are gathered to-day to honor. The American Surgical Association, the Alumni Association of the Jefferson Medical College, and a few friends who have gladly united with us in this service of affectionate remembrance, have presented his statue to the people of the United States, to stand forever in our beautiful capital city as a mute yet eloquent evidence of our esteem for his personal worth and his professional attainments.

It is strange that the human race has failed so grievously to recognize publicly its great medical benefactors. Mr. Lecky, in his last remarkable book, in speaking of the rewards of genius in Great Britain, after enumerating the chief of the extraordinary and beneficent achievements of medical men in the present century, says, " England may justly claim a foremost place in this noble work, and many of her finest intellects have been enlisted in its service. In no single instance has this kind of eminence been recognized by a peerage. It is clearly understood that another and a lower dignity is the stamp of honor which the State accords to the very highest eminence in medicine and surgery—as if to show in the clearest light how inferior in its eyes are the professions which do most to mitigate the great sum of human agony to the professions which talk and quarrel and kill." (*Democracy and Liberty*, i. 429.) And yet Jenner almost saved England from extinction, and Simpson and Lister have done far more to mitigate the terrors of surgery and the pangs of maternity, to save life, and to bring health and happiness to the human race than Marlborough and Wellington and Nelson have done to destroy life and bring sorrow and pain and rapine and misery.

It is pleasant to record that England has atoned, with the opening of this year, for such long-continued neglect. In making Sir Joseph Lister the first medical peer she has conferred less honor upon Lord Lister than upon herself.

The statue of Marion Sims, not long since erected in New York, and this one of Samuel D. Gross, let us hope, are the beginning of a similar recognition of beneficent genius in our own land. Go through the broad streets of this beautiful city, and in its circles and parks and squares you will find, with singular exceptions, only the statues of statesmen and warriors—men who deserve, we all agree, their well-won honors and immortality. But, truly, "Peace hath her victories no less renowned than those of war." Though its heroes are not, it may be, portrayed in marble or in bronze, they are enshrined in the grateful hearts of mankind, immortal in literature, even the humblest of such toilers as the Gideon Grays and the Weellum Maclures that cheer and brighten the world.

And were the soldiers, whose statues one may see everywhere around us, the sole possessors of bravery? In 1832, that most dreaded of all scourges, Asiatic cholera, for the first time broke out all over this country with the greatest virulence. Easton was only eighty miles from New York, and the citizens, in terror lest the dread disease would reach their own town, appointed a young, intrepid surgeon to visit New York and learn what he could for their benefit. When others were fleeing in frightened thousands from the pestilence Gross bravely went directly into the very midst of it, reaching New York when the epidemic was at its very height. In that then small and half-depopulated town 385 persons died on the very day of his arrival—and he staid there a week in a hot July, visiting only its hospitals and its charnel-houses. What call you that but the highest type of bravery?—a bravery which Norfolk and Mobile and Memphis have since seen repeated by scores of courageous physicians ready to sacrifice their lives for their fellowmen with no blare of trumpets, no roar of cannon, no cheers of troops, no plaudits of the press! No battlefield ever saw greater heroes; no country braver men!

Yonder statue of Joseph Henry has stood alone for too many years. We have to-day unveiled its worthy companion. Both of them are memorials of men great in science, whose lives were devoted to the good of their fellow-creatures, to saving life, adding to human comfort, lessening pain, promoting knowledge, cheering the sick, and assuaging even the very pangs of the dying. We do well thus to honor in imperishable bronze the men who have won these victories of peace! To no one can the words of the blessed Master apply with greater force than to the kind surgeon whose time and thought and talents are given to humanity, and, above all, to the poor, with no payment but the grate-

ful look of returning health and rescued life and that inward satisfaction which far surpasses all the wealth of the Orient—" Inasmuch as ye have done it unto one of the least of these, my brethren, ye have done it unto Me."

A CONTRIBUTION TO THE SURGERY OF THE KIDNEY AND OF THE URETER.[1]

BY ARPAD G. GERSTER, M.D.,

OF NEW YORK.

DURING the period beginning June 21, 1895, and ending February 1, 1897, thirteen patients suffering from various affections of the kidney and of the ureter came under the writer's care at Mount Sinai Hospital.

Ureters.

In four cases causative affections of the ureters were observed. In three of them the trouble was relieved permanently by operative procedures which were based upon the labors of Küster, Fenger, and Howard Kelly.

CASE I. *Hydronephrosis of traumatic origin; nephrotomy, followed by successful plastic of the proximal orifice of the ureter; cure.*—J. W., aged nine years, a well-developed, but somewhat emaciated boy, had sustained a severe contusion in January, 1895, while coasting on the snow. Hæmaturia followed and persisted for nearly four weeks. Much pain was complained of also, accompanied by considerable fever, which, however, abated by the end of the third week. About six months later a peculiar scoliotic posture was observed in the boy, which was found to be dependent upon the presence of a tumor located in the right hypochondrium. About two quarts of urinous fluid were withdrawn from this tumor, and the following December three pints were again removed. On January 31, 1896, the following conditions were found: in the right hypochondrium, extending well back into the loin, a large fluctuating tumor; the colon could be determined, both by percussion and palpation, situated below and in front of this tumor. The urinary examination yielded a normal result, specific gravity 1020. The liquid obtained by puncture was clear, straw-colored, and charged with urinary contents. On February 3d, chloroform being administered, the tumor was exposed by an oblique lumbar incision, whereupon, the reflection of the peritoneum being found, this was stripped up until the ureter was exposed. Now the sac was freely incised and evacuated. The attenuated substance of the kidney represented in the plane of section a crescent-like mass occupying the upper and posterior part of the periphery of this sac, having in its middle the thickness of about an inch. On the inner surface of this mass unchanged renal papillæ could be

easily recognized. No sacculation of the calices was present. The proximal orifice of the ureter was very conspicuous, and was found on the anterior wall of the sac about three inches above that part which would be its bottom in the upright posture. It resembled a nipple-shaped elevation projecting about one-third of an inch into the lumen of the sac. (Fig. 1.) The everted mucous membrane of the ureter was

FIG. 1.
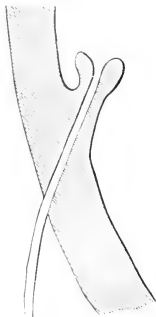
Longitudinal section of renal orifice of ureter.

thickened, hyperæmic, and bled on touch. A silver probe was arrested at about the base of this projection, but the resistance yielded to moderate pressure, whereupon an elastic bougie (No. 5, French measure) was readily passed into the bladder. By the time these facts were ascertained the boy's pulse became thready, wherefore, after being plugged, the sac was attached by a few sutures to the integument, and the wound was dressed. The boy rallied promptly on stimulation, and only moderate fever followed. During the first twenty-four hours one and one-half pints of urine were passed by the urethra. Hence, it could be assumed that the left kidney acted in a satisfactory manner.

FIG. 2.
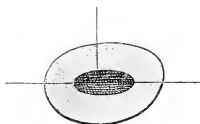
Incision of ureteral orifice.

On February 6th chloroform was administered again, and the orifice of the ureter being exposed, the following plastic operation was performed: the everted rim of the orifice of the ureter was incised on the right and on the left side, as well as in the middle of the upper circumference, the incision being carried far enough downward into the ureter to divide the stricture, also, at three points. (Fig. 2.) The upper

and lower angles of each of these rhomboidal wounds were sutured with catgut — *i.e.*, the longitudinal incisions were sutured transversely (Fenger). It became evident now that the lower portion of the projecting rim also needed a plastic correction. Accordingly a flap of mucous membrane one-third of an inch wide and three-quarters of an inch long and distant from the ureter about one-half an inch, was excised from the lining of the sac, the defect being united by five buried catgut sutures. (Fig. 3.)

FIG. 3.
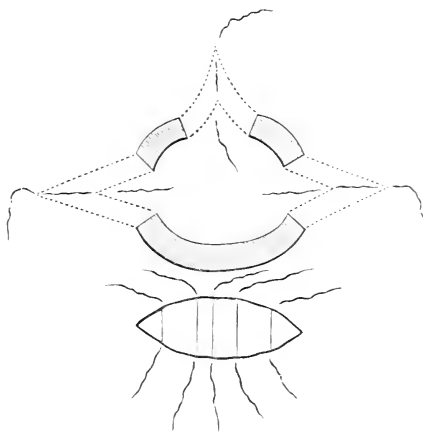
Plastic of renal orifice of ureter.

By this last step the nipple-shaped prominence was converted into a shallow, funnel-shaped depression An elastic catheter having been placed into the ureter, the wound was lightly plugged and dressed. Slight reaction followed, and blood was observed shortly after the operation in the urine voided from the bladder.

On the morning of February 7th the catheter had to be removed from the ureter on account of severe pains radiating toward the bladder and penis. On February 9th the tamponade was renewed. On February 16th the discharge became slightly purulent, with moderate fever. On account of this complication plugging was discontinued, and two stout rubber drainage-tubes were inserted, by means of which the sac was irrigated three times a day with boro-salicylic solution. At the end of each of these irrigations a small quantity of methylene-blue was added to the solution to test the permeability of the ureter. By February 20th methylene-blue staining of the urine voided from the bladder was first observed. There was moderate fever every evening until the end of February. On March 1st the gaping wound was partially closed by means of a number of silkworm-gut stitches passed through the parenchyma of the kidney, leaving an aperture just sufficiently large for the drainage-tubes.

From this time on the boy picked up gradually, leaving the bed on

March 7th, and on March 15th he was sent home to Vermont, with instructions to have the sac irrigated daily. As there was considerable wetting from the renal fistula, a generous moss cushion was applied over the ordinary dressing, by which most of the urine was absorbed.

On April 15th the following report reached me by letter: " There was considerable fever, rising up to 103° F., after the boy's arrival from New York, which, however, abated as soon as the sac was properly irrigated. Thereupon the appetite returned, and the boy commenced to gain flesh and strength. At present there is very little discharge from the drainage-tube. The boy voided about a quart of urine by the bladder, which is acid and contains small quantities of pus."

On May 3d the patient was presented and looked excellently well. I found in the renal fistula a small drainage-tube, the moss cushion nearly dry. The capacity of the sac was ascertained to be one and one-half ounces by measure. Methylene-blue found its way immediately to the bladder. The urine was found to be normal, with the exception of microscopic quantities of pus. I decided to remove the drainage-tube tentatively. By July the fistula was reported closed, and the boy perfectly well.[1]

CASE II. *Hydronephrotic floating kidney; nephrectomy; cure.*—Mrs. T. R., aged twenty-five years, nullipara, stated that on December 1, 1896, she began to suffer from paroxysmal pains of the left loin, without a known cause, requiring the administration of morphine. The paroxysms became milder and rarer, but the patient lost flesh, and was distressed by a ceaseless, dull ache, seated in the left loin, and radiating toward the corresponding groin and femur. A few weeks before this a large lumbar swelling was found by Dr. Paul F. Mundé, who sent the patient to me. The tumor was about the size of a child's head, was very movable, smooth, not painful on pressure, and very tense, so that fluctuation became apparent only after puncture, which yielded a clear, colorless serum, with only traces of urinary contents. The patient having been admitted to Mount Sinai Hospital, the daily amount of urine voided by the urethra was ascertained to be about three pints, of normal quality. Hence it was apparent that the other kidney acted properly. The alternative was either to remove the sac or to attempt the restoration of the function of the ureter, which had been lost through a cause as yet to be ascertained. The matter being laid before the patient, she was told that the former procedure would, in all probability, yield a rapid and complete cure, whereas the latter plan was not so certain in its results, and would require prolonged treatment, and possibly repeated operations. The patient declined any experimental measures, insisting upon the summary proceeding. On December 2, 1896, calomel was administered, followed by salts, causing a number of copious evacuations. The next morning the tumor had disappeared, and only when the patient had been anæsthetized with chloroform, on December 4th, could a flabby, ill-defined mass be felt at the site of the tumor. This was displaced well backward toward the loin by pressure exerted by an assistant's hand, and was exposed by the

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[1] On March 11, 1897, the patient presented himself with renal fistula reopened. The pelvis held one and one-half ounces of fluid. The colored fluid, however, did not descend promptly to the bladder; hence we concluded that a recontraction of the renal aperture of the ureter had taken place, which will need further correction.

usual oblique incision. It was seen to consist of a much-distended kidney and its pelvis. It was very readily stripped out of its fatty capsule and withdrawn from the cavity, which was a very easy matter on account of the long pedicle. The pedicle being now compressed, the pelvis of the kidney was laid open by an incision carried freely through the attenuated cortex. Within the distended pelvis the entrance to the ureter was easily found, and appeared to be normal. The ureter was patulous throughout. Hence the hydronephrosis was due to obstruction by flexion. The kidney itself presented a characteristic example of what Fenger describes as sacculated cystonephrosis. Each calix was much distended, communicating by a narrow orifice with the pelvis of the kidney, so that the mass really consisted of a number of smaller sacs communicating with the larger cavity of the pelvis. Fenger had succeeded in curing a similar case by operation. He split the kidney in two longitudinally. The profuse hemorrhage proceeding from the large branches of the renal artery running through the septa was controlled by continuous suture. The septa separating the calices from the pelvis were severally divided. In this, our case, the correction of the sacculation would have needed the complement of a repair of the defective ureter—*i.e.*, a portion of its proximal end would have been excised so as to shorten and stretch it, to prevent folding upon itself. Finally, the shortened ureter would have been implanted into the deepest part of the renal pelvis, as was done successfully by Küster. In view of the unwillingness of the patient, we had to abandon this enticing plan, and the kidney was accordingly removed. The ureter and vessels were severally tied with catgut. A drainage-tube was placed into the bottom of the wound, most of which was closed by suture. There was an uneventful recovery, the patient being discharged cured December 30th.

It must be considered a decided advance in the right direction that the cure of hydronephrosis caused by obstructions in the ureter, or the pelvis of the kidney, or the elimination of renal fistulæ, is now attempted in a conservative manner rather than by the sacrifice of the kidney, which procedure begins to appear rather barbaric. However, it must be added that external considerations, as, for instance, the choice of the patient, or a dangerous collapse caused by hemorrhage or heart-failure, may still and will compel the surgeon occasionally to have recourse to the summary process of nephrectomy, which, after all, yields a rapid and certain result. Under circumstances similar to those here related was I compelled to remove an otherwise healthy kidney in February, 1895, at the German Hospital. The case is reported in the *Annals of Surgery* for January, 1896.

CASE III. *Empyema of the ureter after nephrectomy; extirpation of the ureter; cure.*—J. K., aged twenty-six years, photographer, sustained during his twelfth year a severe compound injury of the left upper extremity, followed by suppuration and great deformity. In the summer of 1893 nephrotomy was performed on him for pyonephrosis by Dr. Park, in Buffalo, and the kidney being found to be totally disintegrated it was immediately removed. A rebellious fistula persisted, which closed from time to time. Whenever this occurred

symptoms of fever and retention supervened, which abated only after perforation and evacuation of the lumbar abscess. He was admitted to Mount Sinai Hospital in July, 1896. Considerable pyuria and an abscess of the prostate were found. This being incised, the pyuria still continued. Cystoscopy was impossible on account of a tight stricture of the prostatic urethra. In the left loin a very deep sinus was seen passing from the centre of the old scar downward and forward, and discharging from time to time large quantities of pus. No tumor could be felt in the hypochondrium. It was suspected that the discharge might be due to a retained ligature, wherefore the cicatrix was extensively laid open, but no ligature could be found. The large wound was packed, and as the wound was beginning to contract a remarkable variation in the amount of the discharge was observed. Whenever the sinus was discharging copiously the urine became nearly normal, but when the lumbar sinus had contracted large quantities of pus appeared in the urine. This alternation made it evident that the suppuration must be due to a diseased condition of the ureter. The wound in the perineum healed very slowly, closing by the middle of October. On November 13th we proceeded to extirpate the ureter. The most difficult portion of the task was the finding of the renal end of the ureter, which was searched for in a large cicatricial mass closely connected with the peritoneum. I decided not to work at random, but to proceed systematically, my plan being to find the reflection of the peritoneum and to follow this toward the spinal column, gradually raising the peritoneum from the cicatrix until the ureter was found. This plan proved to be successful. An oblique incision following the old scar, and continuing beyond it far enough forward, was passed through the abdominal muscles until the peritoneum was exposed in the anterior angle of the wound. This being stripped up, the posterior aspect of the descending colon became visible. Where the cicatricial mass commenced the peritoneum was dissected up with the knife carefully and slowly, the dissection progressing toward the median line. While thus proceeding, on account of the unyielding cicatricial deposit, the space became somewhat cramped, wherefore a second vertical incision, running parallel and close to the margin of the quadratus muscle, was added. This liberated the tissues to such an extent that the ureter was soon exposed. Its renal orifice was recognized by the everted hyperæmic mucous membrane. From this point on the operation became very easy. The peritoneum was stripped up along the downward course of the ureter. We found Cabot's statement beautifully verified, that on raising the peritoneum the adherent ureter would follow it. The oblique incision was further extended downward, and afterward to Poupart's ligament, care being taken to leave a sufficient muscular mass attached to the rim of the os ilium to enable us to apply an abdominal suture. Successively the psoas major and minor muscles, then the iliac vessels, were exposed, and the ureter was separated from its peritoneal adhesions. The vas deferens could not be seen. The lower portion of the ureter was found to be distended, its diameter being nearly three-fourths of an inch, its lining very tumid and strongly injected. It contained a large quantity of pus, which welled up unexpectedly, flooding the field of operation. Close to the bladder the ureter was found to be very brittle, and a continuous dissection became impossible. On attempting to pass a sound into the

bladder it was found that in close proximity to the lower orifice of the ureter a stricture existed, which, however, permitted the passage of an ordinary silver probe. The ureter was removed close to this stricture, its estimated distance from the bladder being not more than an inch. The wound was now thoroughly cleansed by irrigation, and its middle portion being closed by a dozen stout silkworm-gut button sutures, the upper and lower angles were drained and left open. The procedure had consumed about two hours, and the patient had become very weak. The small and rapid pulse did not respond promptly to energetic stimulation, and the patient's condition remained critical for forty-eight hours. Profuse sweats, continuous vomiting, cold extremities all bode evil, and could not be ascribed to loss of blood, which had been moderate, but had to be rather charged to the extensive stripping up of the peritoneum. Finally the pulse improved, the patient's temperature rising from subnormal to 101° F. Lively suppuration followed from the bottom of the enormous wound, but the drainage was adequate and the abdominal suture healed throughout by first intention. The upper angle healed first. It took about four weeks to bring about closure of the entire wound. To enable us to deal with the patient's cystitis the urethral stricture was gradually dilated, and the bladder frequently irrigated. On January 22, 1897, a cystoscopic examination was made. It was found that the orifice of the right ureter was normal, that of the left ureter being difficult to locate in the mass of hyperæmic ridges of mucous membrane. Gradually the cystitis also yielded, and the patient, formerly suffering from very frequent urination, can at present hold his water for two hours. His general condition has improved wonderfully, and he is still gaining weight. The patient was thereupon presented for inspection.

Pertaining to this subject is the observation that certain forms of pyelitis are maintained by temporary causes, which are very often relieved as soon as the pelvis of the kidney is drained through a direct incision made from the loin. A clot of blood or fibrin, or a calculus, may be the cause of such transient disturbance. In the fall of 1894 I had occasion to test this method of treatment in a case of acute pyelitis with evident retention. After maintaining drainage for about four weeks the febrile symptoms disappeared, and the drainage-tube being withdrawn the wound healed, the patient making a perfect recovery. In the following case, however, the relief was temporary only, lasting so long as the renal fistula was open:

CASE IV. *Double pyelitis, with intense cystitis; nephrotomy of the left side; temporary improvement.*—Mrs. G. Z., aged thirty-eight years, multipara, had been suffering for three years with very painful urination. The urine, voided in small quantities, was turbid and very often, toward the end of micturition, tinged with blood. For two months she complained of frequent attacks of lumbar pain. The robust woman was admitted to the hospital March 3, 1896, and her physical condition was found to be otherwise sound. On cystoscopy, according to Kelly's method, the bladder was found to be extremely irritable, its mucous membrane everywhere velvety, bleeding on touch. The trigo-

num, especially, was found to be much injected and intumescent, so
that the left ureter could not be found. Catheterism of the right
ureter, however, was accomplished, and twenty-eight grammes of a
moderately turbid, acid urine were secured, which contained few pus-
and blood-corpuscles, specific gravity being 1024. The kidneys could
not be felt by palpation, but intense pain was complained of on pressure
exerted over the left lumbar region. The patient voided forty-one
ounces of urine from the 3d to the 4th of March. Diagnosis was made
of double pyelitis, with chronic cystitis. The bladder would not hold
more than two and one-half ounces of fluid during deep anæsthesia.
On March 26th the left kidney was exposed. The aspirating-needle
withdrew from the pelvis about two ounces of slightly turbid urine.
Hence it was fair to conclude that it was somewhat distended. Along
the aspirating-needle the pelvis of the kidney was freely incised, the
incision being carried through the convexity. The surface of the
kidney, as well as the parenchyma, appeared normal. Little reaction
followed, the frequent urgency to urination becoming decidedly dimin-
ished, presumably in proportion to the reduced quantity of urine
passing out through the bladder. April 1st cystoscopy was repeated,
and the condition of the interior of the bladder was found unchanged.
April 21st the patient was discharged at her own request, with the
advice to wear a drainage-tube for several months. The disagreeable
wetting of her clothing caused by the renal drainage, however, dis-
couraged her so soon that she had the tube withdrawn by the end of
May, whereupon the fistula closed within a very short while. There
was a strong suspicion of tuberculosis, which, however, could not be
confirmed, though frequent search for Koch's bacilli was instituted.
Inoculation of a rabbit with the urinary sediment yielded also a nega-
tive result.

Echinococcus of the Kidney.

It is well known that the kidney becomes very rarely the seat of
hydatids. Statistics show that the left kidney is about twice as often
attacked as the right. The literature of the subject, comprising over
three hundred recorded cases, contains only one instance of calcification
of the sac. In Simon's case (No. 6) partial calcification is mentioned,
whereas in this, our case, the entire sac was calcified throughout.

*Echinococcus of the right kidney; hydatids voided by the urethra; ex-
posure of the large tumor; incision and evacuation of the contents of the
calcareous sac; secondary extirpation of the concremental shell; cure.*—
Mrs. E. D., aged twenty-six years, was presented by Dr. Steudel, of
Seymour, Conn., June 19, 1895. The delicately built, small woman was
pregnant in the sixth month, and stated that up to within three months
she had felt entirely well, with the exception of a dull and heavy feel-
ing she had observed to exist in the right hypochondrium for about
seven years, which, however, had caused her no serious inconvenience.
She said that eight years ago, while serving in a place in Germany, she
had to feed regularly a number of dogs. A fortnight ago she was
attacked by severe renal colic while voiding urine, and she observed
that toward the end of micturition a number of grape-like bodies
passed away from her. A collection of these bodies was shown to me,

which I immediately recognized as secondary hydatids. Dr. Steudel also found a considerable tumor in the right loin, which on examination was found to be smooth, unusually resistant, non-fluctuating and immovable. It extended downward in the right hypochondrium to the level of the navel, but was not influenced by the respiratory movements. Corresponding to the lowermost portion of the mass a smaller, knob-like, softish projection could be felt, which was very tender on pressure. By percussion it could be ascertained that the tumor extended upward to the level of the seventh rib posteriorly. Moderate nightly elevations of the temperature were observed, on account of which circumstance I advised an operation. Being admitted to the hospital, her daily quantity of urine was found to be 1430 grammes. It contained neither albumin, pus, nor sugar. All other organs were found normal. On June 21st, the patient being chloroformed, the tumor was exposed by an oblique lumbar incision. Now it became evident that the knob-like projection found on the lower circumference of the mass consisted of about two-thirds of the normal kidney, upon the upper pole of which, and connected with it, rested the large ovoid tumor, having the shape and size of a small cocoanut. The attempt to puncture the tumor failed because a stout needle could not be forced into it, breaking off. Finally, with considerable trouble, a square aperture was cut into the bony investment of the tumor by means of a stout resection-knife. Besides a small quantity of turbid serum, the cavity contained nothing but a closely packed, nested mass of hydatid membranes, enclosed in a large outer membrane. All this material being scraped out with a sharp spoon, it was seen that the rough, bone-like shell was bleeding wherever scraped, hence it became clear that it was organized. The oozing was so considerable that it became necessary to plug the cavity and to dress the wound. It may be added that the sharp spoon encountered everywhere the same resistance that an osseous cavity would offer to it. The place of communication between the hydatid cyst and the pelvis of the kidney could not be found.

The operation was borne very well; but in the course of the next week it became more and more evident that the cavity had not the slightest tendency to collapse and to diminish. It was clear that as long as the hard shell remained closure of the wound could not be expected. In Simon's case a number of small, bony plates were expelled, having apparently sloughed away. In this our case, however, we had to deal not with a rudimentary formation of small detached osseous plates, but with a complete bone-like capsule of extremely hard material, which, as we saw later on, varied in thickness from between one-fourth to one-half of an inch, and was well vascularized everywhere. Hence it was not probable that spontaneous expulsion would occur. As it is well known that the outer sac of echinococcus-cysts enters into intimate connections with all the organs of the vicinity, extirpation of the sac is rightly considered one of the most difficult undertakings, and was condemned as improper and inadmissible by Simon. In spite of these considerations the contingencies of the case seemed to

point urgently to the necessity of extirpation, which, with the consent of the patient, I determined to carry out.

On July 15th she was accordingly chloroformed. The operation was an exceedingly difficult, troublesome, and laborious one, both on account of the deep and inaccessible situation of a large part of the osteoid sac, and on account of the serious complications which had to be encountered in the shape of the invasion of both the pleural cavity and the peritoneum. Two of the lower ribs had to be excised, and even then the removal of the closely adherent calcareous masses was very difficult, and blunt dissection inapplicable. The edge of the knife had to be used throughout. When the pleural cavity was widely opened alarming cyanosis and heart-failure set in. The pleural defect was quickly plugged, and artificial respiration was instituted. After about five minutes the patient's condition had improved so far that the operation could be continued. It was found that, just as on the pleural side, so toward the peritoneum the sac had incorporated the serous membrane, and that a large portion of the peritoneum had to be taken away. As soon as the mass was detached from the peritoneum the defect was closed with a catgut suture. The irregular-shaped, calcareous shells composing the entire capsule were of different sizes, the largest one measuring over 7 cm. in both directions; but most of them were much smaller and were connected along irregular lines by short and dense connective tissue, resembling the lines of cranial sutures in an infant's skull. Finally, after about two hours' hard work, all the calcareous masses were removed. The wound was packed and the patient brought to bed. Considerable collapse followed and had to be combated by frequent stimulation, recurring from time to time unexpectedly, so that considerable vigilance had to be exercised. Finally, on the third day, the pulse was steadier and the patient's face lost the pinched look. On July 19th the packings were removed from the main cavity, and it became evident that this had contracted very considerably. The pleural packings were removed on July 21st, and from this date on progress was steady and rapid until the middle of August, when the patient aborted, but this did not retard her recovery long. Her general condition improved steadily, and the large cavity contracted rapidly, so that the patient could be discharged cured, August 22d. Professor Simon mentions explicitly that in his case (No. 6) the extruded plate-like mass contained osseous tissue. In our case Dr. Schwyzer, pathologist of the German Hospital, found only calcareous matter. The remarkable collection of potsherd-like concretions presented vividly recalls the shape of infantile cranial bones. The patient, also presented, is now perfectly well. On palpation the kidney can be felt connected with a resistant mass resting above it, which undoubtedly consists of shrunken cicatricial tissue.

A Plea for an Earlier Performance of Nephrotomy in Acute Inflammatory Conditions of the Kidney.

In the year 1890 a young woman was admitted to Mount Sinai Hospital with rebellious and rather profuse hæmaturia, which was evidently of renal origin. No traumatism, no acute malady had preceded, and the hemorrhage had persisted three weeks before the admission of the

patient, who presented the signs of considerable exsanguination. Her spleen was not enlarged, the quantity of urine normal, its composition altered only inasmuch as it contained a great deal of blood and a few pus-corpuscles, which probably came from the vagina. Every evening slight elevations of the temperature were observed, and the left kidney was rather sensitive both on pressure and spontaneously, and sufficiently enlarged to be felt on palpation. I thought of the possibility of tuberculosis, calculus, or of a neoplasm of the kidney. A number of attempts were made to influence the hemorrhage by internal medication, but were ineffectual. Finally the condition of the woman became so alarming that I decided to explore the kidney. Accordingly nephrotomy was done. It was found that the organ was considerably enlarged and turgid, and that the capsule was extremely tense. The kidney-fat was œdematous. Punctures yielded a negative result. The capsule was incised along the entire convexity, whereupon the parenchyma of the kidney bulged out somewhat. The capsule was strongly adherent, and the surface of the kidney marked by a number of punctate and stellate hemorrhages. By an incision carried through the convexity, the pelvis of the kidney was opened, and, the left index-finger being introduced into it, the entire circumference of the organ was examined bimanually. No stone and no appreciable tumor were found, and the pelvis gave the sensation of a normal mucous membrane. A drainage-tube was introduced, through which large quantities of bloody, urinous serum were discharged. It was noted that the urine voided by the urethra contained much less blood the day after the operation, and in the course of the next ten days the blood-staining of the urine disappeared entirely. The local and general disturbances also disappeared, and a fortnight later the drainage-tube was withdrawn, whereupon the wound healed rapidly. I had occasion to see this patient in the year 1893, when she told me that she had been perfectly well ever since her last illness. According to these facts, tuberculosis, neoplasm, and calculus could be positively excluded, it being evident that we had to deal with a form of acute nephritis accompanied by great tension. The hyperæmia gave rise to capillary hemorrhage, which was relieved by the drainage and relaxation of tension afforded by nephrotomy.

Within the last few years similar experiences have been noted by other surgeons, and finally there appeared in *The Lancet*, in its issue of January 4, 1896, a communication by Reginald Harrison, in which the indication for the performance of nephrotomy is extended to some forms of acute albuminuria which are accompanied by swelling and tension of the kidney. The following lines of thought will appear very natural to the surgeon who is accustomed to see the deleterious influence of great tension and infectious retention on various glandular organs. Every form of glandular inflammation, whether produced by purely chemical or microbial, and through them indirectly also chemical, influences, is accompanied by pronounced disturbances of the circulation, which manifest themselves through the presence of hyperæmia, stasis, exudation, and tension. It is well known how favorably the initial stages of these conditions are influenced by a free incision, which

relieves tension. Especially noticeable is this where glandular tissues are enclosed in a stout capsular envelope, as, for instance, the testicle, the submaxillary and parotid glands. In the case of the testicle and submaxillary salivary gland infection and excessive tension may lead to total necrosis, as can be seen in angina Ludwigii and in cases of so-called spontaneous gangrene of the testis. As far as the final result is concerned, it is not different whether the infection entered through the secretory ducts or through the circulation by embolism.

Very similar must be the conditions in the kidney. Total, embolic necrosis of the kidney, however, is an extremely rare occurrence, there being only one case (Friedlander's) on record. The circumstance is explained by the large size of the renal artery. But the destruction of multiple circumscribed areas of the organ is a common observation. And where the integrity of the kidney is attacked through chemical influences circulating in the blood we see that the secretory apparatus of the organ is primarily attacked. If the invasion is a general one, we see that the disturbance is followed in its highest degrees by marked diminution in the urine, which becomes bloody and charged with albumin, or finally by total and fatal suppression. Very often, in the primarily non-fatal cases, lasting damage is done. The destroyed secretory elements are not only not restored, but their continued disappearance will finally culminate in uræmia. Furthermore, the modifying influence of purely mechanical interference with the normal circulation of the kidney by valvular lesions of the heart, or of a vicarious congestion due to sudden disability of the other kidney, through traumatism, operation, or morbid processes, will also have to be considered. Finally, as before stated, we have to mark the difference between forms of nephritis characterized by rapid and extensive destruction noticeable to the naked eye, and processes of degeneration which affect only the finer structure of the kidney. The questions which present themselves upon the basis of these reflections are: *First,* Will the relief from tension afforded by early nephrotomy and drainage exert a favorable influence upon the initial stages of acute infectious processes of the kidney, which otherwise would lead to suppuration? *Secondly,* Will nephrotomy exert a curative influence if it is performed during the initial hyperæmic stage of certain forms of infectious, non-suppurative nephritis, which have a tendency to lead to ultimate loss of the specific function of the organ, and are not relieved by internal medication?

Before answer is attempted to these questions we have to examine what danger is involved in the performance of the operation of nephrotomy. We know that the relative danger of nephrotomy is directly proportionate with the extent of the renal damage. Tuffier (Duplay et Reclus, *Traité de Chirurgie,* tome vii.) gives a rate of mortality for nephrotomy performed in non-infectious cases of renal calculus of 6

percentum; while in cases of pyonephrosis the rate for the same operation is 23.3 per cent. Other authors have arrived at similar figures. My own statistics, embracing twenty-one nephrotomies, contain only one case of death following this operation, and in this case, as we shall see, the cause of death was really not dependent upon the operation. From this we see, then, that nephrotomy can be considered a comparatively safe operation. As a purely technical problem, nephrotomy is known to every surgeon to be, under ordinary circumstances, a simple and easy procedure. The hemorrhage unavoidably encountered is trifling and easily controlled, and the hemorrhage caused by the incision of the renal tissue itself, though profuse at first, is also easily checked by packing. Should one or more of the larger branches of the renal artery, traversing the septa, be injured, the slight pressure exerted by a good pack will always control the bleeding.

Let us return now to the questions which we have raised. To answer it in a categorical fashion, it is necessary to ascertain the degree of the injury sustained by the renal structures in each given case. The physical and chemical aids at our disposal are extremely valuable and important, but cannot yield the result that is gained from a systematic search made through the parenchyma of the kidney itself by the microscope. I consider Fenger's advice, to avail ourselves of each opportunity afforded by a nephrotomy to remove a segment of the kidney for microscopical examination, extremely useful. No harm is done to the patient, and more definite and precise information is gained regarding the actual condition of the kidney than from the examination of the urine alone, which occasionally leaves us in the lurch altogether. Momentous changes, as, for instance, capillary embolism with consecutive infarction, the presence of pathogenic microbes in the primary urinary channels, desquamative processes, and shrinkage of the glomeruli and canaliculi, can be positively recognized. In case of recovery their former existence cannot be gainsaid. As to the questions themselves, these answers can be given:

First, in all forms of suppurative inflammation of the kidney the surgical principle of early and extensive incision, to relieve tension and to afford drainage, is to be maintained with the same strictness and emphasis as it is accepted for all cases in which the suppurative focus is enclosed in rigid envelopes, capsules, fasciæ, or the periosteum. If a timely incision is not made, increasing tension will inevitably end in the death of the tissues. What we are accustomed to do without hesitation in phlegmonous affections of the subaponeurotic tissues of the palm, in suppurations of the bursæ, of the submaxillary and parotid glands, of the joints, and in acute infectious osteomyelitis—*i. e.*, a free incision, should be done just as unhesitatingly in suppurations of the kidney. The objection that the diagnosis is difficult on account of the deep situation of the organ

is not new. It had to be met, and was swept aside when the patholog-
ical conditions just mentioned were clearly recognized. With our ability
to diagnosticate deep-seated suppurations at an early stage the hesitation
formerly felt has disappeared. It is undoubtedly true that in some of
the most destructive invasions of the kidney, as, for instance, in ascend-
ing septico-pyelonephritis, or in multiple embolic nephritis, one or
another or several of the important physical diagnostic signs may fail.
But by skilfully excluding all other organic disturbances, and in the
presence of grave and threatening danger from suppression, the sur-
geon's action will be determined by weighing all the apparent circum-
stances. One of the most important and reliable signs of a serious
involvement of the kidney is local pain on pressure. But even this
symptom may be occasionally absent, as will be seen from the case
published by Dr. Howard Lilienthal, in *Annals of Surgery*, March,
1896, Case No. 3. The patient in question was operated on in the sur-
gical division of Mount Sinai Hospital. The history is as follows:

Four weeks after an acute osteomyelitis of the upper jaw, treated by
extensive incision and the extraction of a sequestrum, the course of
healing having been complicated by an attack of erysipelas, suddenly
high fever developed with a rigor, accompanied by exquisite lumbar
pain of the right side. The urine was normal, except that it contained
a trace of albumin, and micturition was painless. Guided by the lum-
bar pain, Dr. Lilenthal incised, on May 5th, a cortical abscess of the
right kidney. The sepsis continuing, another abscess was found on May
20th by an exploring-needle, and was also incised. At this time the
urine was still free from pus, containing only a trace of albumin and
a few blood-corpuscles, together with a few granular casts. The sepsis
still continued, the patient losing ground visibly. He was delirious and
somnolent. On July 10th I examined the patient with Dr. Lilienthal.
He was extremely emaciated, and presented the features of the gravest
septico-pyæmia. A thorough examination of all the internal organs
evinced nothing positive. No pain on pressure could be found any-
where. In spite of this, and on account of the absence of other organic
changes, I advised a renewed exploration of the right as well as an
incision of the left kidney. Accordingly, on July 23d, Dr. Lilienthal
incised in both kidneys a number of cortical abscesses. The patient
recovered and was discharged cured September 29th.

We had in this instance a very encouraging example of the utility of
surgical procedure in a case of multiple embolic suppuration of both
kidneys, an affection which heretofore was considered absolutely hope-
less. On the other hand, it is very questionable whether the most ener-
getic measures will be of any use where the multiplicity of suppurative
foci virtually amounts to a complete destruction of the organ. This
condition is comparable to the infiltrating, diffuse phlegmon of a limb,
in which the most thoroughgoing and extensive incision cannot lay open
every focus of infection, and where the danger to life can be eliminated

only by an ablation of the entire organ. This remark refers to a late stage of the infection. Different, however, is our standpoint when we assume that by an early and extensive incision this very destruction may be prevented. At any rate, it is proper that this interesting and important question be submitted to a thorough test. Assuming that the rapid extension of the destructive process can be modified and checked by an early incision, this procedure assumes a truly conservative value. The rapidity with which the kidney may become compromised can be estimated from the following history :

Chronic cystitis ; acute parenchymatous nephritis with miliary abscesses ; nephrotomy ; nephrectomy ; cure.—Mrs. S. S., aged thirty-four years, was admitted December 13, 1896. Had had two children, and stated on admission that she had been suffering from painful micturition for two years. Her strangury was so intense that occasional catheterism was necessary. On December 7th, shortly after a catheterism performed by her family physician, she suddenly felt an intense, cutting pain in her left loin, which was followed by a violent chill and high fever. Each paroxysm was accompanied by retching and vomiting. The lumbar pain was growing steadily worse, radiating toward the bladder and left thigh. On admission a temperature of 104° F. was found. A continuous desire to urinate tormented the patient, even when the bladder was empty. Her pulse was small, very frequent ; her integument bathed in perspiration, and in the left loin an exquisitely painful tumor could be felt, which was overlapped by the colon, and was evidently the left kidney. During nine hours which preceded the operation she voided thirteen and one-half ounces of urine, which was alkaline, had a specific gravity of 1022, contained a trace of albumin, a few pus-corpuscles, but no blood. She was chloroformed as soon as I had seen her, and the enlarged kidney was exposed. It was observed that a considerable quantity of watery serum escaped from the fatty envelope of the kidney, which was œdematous. The surface of the kidney appeared to be deeply congested. As soon as the capsule was incised the parenchyma bulged out. When the cortex was incised no blood was seen to flow, but turbid, bloody serum was escaping. Several punctures of the kidney were made, until finally a cavity, evidently the pelvis, was found, from which also a dark-brown bloody serum was withdrawn. Using the needle as a guide, the pelvis of the kidney was freely incised, the incision penetrating from the convexity. While a finger was dilating the deeper part of the incision a resistant band of tissue gave way. This was followed by extremely profuse arterial hemorrhage, which, however, was easily checked by firm plugging with iodoform-gauze. To encourage secretion the kidney was separated everywhere from its fatty envelope, and was surrounded with gauze compresses. Then the wound was dressed.

The only change observed was the disappearance of the acute pain, but retching and the high fever remained, though not so intense as before the operation. When the dressing was changed on December 14th the absence of that copious sero-sanguinolent discharge was noted which is seen regularly to follow nephrotomy. The same observation was made during the following three weeks. Nineteen and one-half ounces of

urine were voided on December 15th. It was alkaline, containing few pus- and blood-corpuscles, a trace of albumin, and had a specific gravity of 1024; strangury unchanged. These observations made it extremely probable, not only that the secretion of the diseased kidney was remarkably scanty, but also that its ureter was occluded. Otherwise much blood would have descended to the bladder. On December 20th the deep packings were removed from the kidney. Renewed arterial hemorrhage compelled us to replace them immediately. Some pus also escaped, but its source could not be ascertained. The quantity of urine passed by the urethra had increased, December 16th, to forty, December 20th, to sixty ounces, and its reaction had become acid. No blood was found in it at any time before January 7th. With continuing fever and vesical pain the condition of the patient became gradually and steadily worse. Several larger and smaller abscesses had broken through into the drainage-channel, and it became evident that the patient would succumb unless the kidney were removed. Accordingly on January 7th this was done. The day preceding the operation sixty-two ounces of urine were voided, hence we concluded that the other kidney was acting in a satisfactory manner.

During the nephrectomy the following facts were observed: the volume of the kidney had shrunk to about the normal standard. Its parenchyma had a waxy pallor. In the lower portion of the kidney an abscess containing about two ounces of pus was found. Separation of the vessels and ureter was very difficult on account of their extreme shortness. One of the ligatures slipped after the kidney was cut away, and the tremendous hemorrhage was controlled by a large clamp. The wound was packed and treated by the open method. The patient bore the operation very well. By January 11th there was a marked diminution of the fever noticeable, and the daily quantity of urine, which had fallen from sixty-two ounces to twenty-six ounces after the operation, arose from twenty-eight ounces on January 11th to seventy-one and one-half ounces on January 12th, which remarkable rise was undoubtedly induced by copious draughts of water. The urine contained much blood the day after the operation. From this day on recovery went on uninterruptedly. The last ligature came away on January 29th, and February 4th the larger part of the wound was closed by secondary suture. At present the patient is expecting her early discharge. It may be added that the strangury ceased immediately after the nephrectomy. The urine is at present acid, abundant, and contains nothing abnormal except a slight trace of albumin. The pathological report on the specimen is as follows:

Diagnosis. Acute parenchymatous nephritis, with embolic abscesses; incipient purulent nephritis.

Glomeruli partly normal, partly atrophic; in the latter case the capsule is filled with granular material; the epithelium congested; the canaliculi show granular degeneration; nuclei do not accept staining. The epithelium is swollen and necrotic; everywhere between the canaliculi round-celled infiltration, without increase of the connective tissue. Vessels appear to be normal, with the exception of the smaller capillaries, which are clogged with a large number of small cocci, probably staphylococcus. The cocci become beautifully visible by staining with Löffler's solution. Inside of the canaliculi there are also groups of short rods, which take the Löffler stain. Everywhere in the cortex are small,

but well-defined agglomerations of degenerated white blood-corpuscles, which can be accepted as miliary abscesses.

Nephrotomy was performed in this case six days after invasion, but the destructive process was not checked by it, nor could the infectious material accumulated in the kidney be drained away in an effectual manner. Had nephrotomy been done twenty-four or forty-eight hours after invasion, would it have been otherwise?

Fulminant and fatal case of double ascending gonorrhœic nephritis deserves to be described here on account of its rarity:

J. J., aged ten years, acquired gonorrhœa while crossing from Europe in the steerage of a transatlantic steamer. The disease became manifest on April 30th, when he arrived. On May 15th difficulty of micturition and fever set in. May 22d—*i. e.*, eight days before his admission to the hospital—violent lumbar pain of both sides was complained of. Three days previous large quantities of pus were voided by the urethra, followed by some blood. After that continuous high fever prevailed; the secretion of urine becoming gradually diminished, and finally scanty. On admission, on the evening of May 30th, the following facts were observed: the patient somewhat cyanosed, somnolent, covered with perspiration; his extremities cold; temperature 101.4° F., pulse 130; copious purulent discharge from the urethra, from which there escaped at short intervals, involuntarily, bloody, turbid urine in small quantities; the urine charged with pus, albumin, and blood; alkaline; its specific gravity 1030. The following morning I found, in addition to the facts just related, both kidneys perceptibly enlarged and palpable, especially so the right one, which was exquisitely painful to touch. The amount of urine voided during the entire night was *eight ounces*. In spite of this desperate condition I determined to incise both kidneys. After the administration of a small quantity of chloroform to produce primary stupor, the right kidney was rapidly exposed. Its fatty capsule was found very œdematous, the kidney itself enormously enlarged and tense. When the cortex was deeply incised there was no hemorrhage. The parenchyma appeared dusky, almost brown, and mottled with a large number of gray spots. It was extremely brittle, discharging turbid, reddish-brown serum. The same kind of serum escaped from the pelvis. A large drainage-tube was slipped into the opened kidney, and the wound was packed. On account of failing pulse incision of the other kidney was desisted from. The patient rallied from the collapse, but his previous condition remained unchanged. The amount of the urine continued to diminish, until the suppression became absolute. The boy died twenty hours after the operation, with a temperature of 105° F. The minutes of the post-mortem examination, made by Dr. Mandelbaum, the pathologist, on June 1st, read as follows:

Both kidneys very much enlarged, especially so the right one, which seemed to be increased to double the normal volume; the left kidney was much congested, containing in its lower portion an abscess which held 4 c.cm. of the pus; the right kidney converted into a mass of innumerable abscesses varying from the miliary to the size of a cherry; capsule strongly adherent; the cortex much thickened. In stripping off the capsule a large number of subcapsular abscesses were exposed; the lower

half of the kidney occupied by a large disintegrating clot; the ureters normal, with the exception of the lower thirds, which are much congested; vesical walls considerably thickened; vesical mucous membrane everywhere hemorrhagic; the prostate much enlarged, strongly congested, and containing a nearly empty abscess-cavity, which still held 2 e.cm. of pus. Slide-preparations of pus gained from the kidneys contained multitudes of staphylococci and gonococci. The blood-serum and serum-agar cultures of the same pus yielded colonies of gonococcus and staphylococcus albus. The pus from the prostate, however, yielded only staphylococcus albus. Cultures made from the urethral discharge remained sterile, probably because they were taken shortly after the escape of some urine. Microscopic sections of both kidneys gave evidence of unmistakable pyelonephritis, and showed luxuriant colonies of gonococcus and staphylococcus by means of Löffler's solution. Gonococci were in every instance decolorized when treated by Gram's stain.

In the presence of such an extraordinary invasion of both kidneys little can be expected from any therapy instituted at a late period of the disease. I wish to emphasize the opinion that when both kidneys are attacked simultaneously in a very virulent manner the indication for energetic action seems to be most urgent, and that much more ought to be done than heretofore in this field, scarcely cultivated by any surgeon. The same indication presented itself in another case during the period of time comprised in this paper, but my urgent wish to interfere was frustrated by the resistance of the patient:

Repeated nephrotomy for pyonephrosis; relapse; nephrectomy; suppression; death.—J. W., aged thirty-five years, had been operated on by me for calculous pyonephrosis in May, 1893, at the German Hospital. Two stones were removed, and the patient was discharged cured. On February 23, 1895, the same operation was performed a second time at Mount Sinai Hospital by Dr. Lilienthal, who also evacuated much pus and removed one stone from the kidney. The patient again recovered, and the wound healed. The patient was readmitted February 24, 1896. He stated that his old pains had recurred in the lumbar region, with high fever, chills, and vomiting. Strangury and augmenting pain drove him to the hospital, where a considerable tumor was found occupying the left loin, with a temperature of 100.6° F., and alkaline urine, which contained much albumin, pus, phosphates, and hyaline casts. The daily quantity of urine was fifty-one ounces. The right kidney could not be felt, nor was deep pressure exerted upon the right loin painful. February 27th the bladder was emptied and irrigated, preparatory to a cystoscopic examination, which, however, could not be carried out on account of the occurrence of a severe chill. March 2d, under chloroform, the old scar being incised, the much-enlarged left kidney was exposed and opened. It consisted of a thin-walled bag, composed of a number of communicating cavities distended by pus, many of these cavities still containing stones. As the organ had become manifestly useless it was immediately removed. Hemorrhage was very moderate, and the patient rallied well from the operation. During the following night very little urine was voided (eleven ounces in sixteen hours), becoming more and more scanty. The patient was apparently failing.

His pulse was very rapid; the temperature 104.6° F.; the skin covered with a clammy perspiration. My proposition to relieve the right kidney by a free incision was firmly declined, and the patient died March 4th in a comatose condition. No post-mortem could be had, but the right kidney was withdrawn through the existing wound, and was found in a state of purulent pyelonephritis, which seems to have existed for some time.

It is proper for me to make this remark that, had I been content with simply incising for a third time the left kidney, the patient's life would have been probably prolonged.

How little can be expected from simple nephrotomy in the presence of a multiple suppuration of the kidney can be seen from the following case:

Tumor of the kidney with pyuria; nephrotomy and evacuation of five renal abscesses, each containing a stone; closure of the wound; recurrence; nephrectomy of the calculous kidney; cure.—Mrs. J. V., aged forty years, multipara, admitted June 8, 1896, stating that she had suffered from persistent hæmaturia five years ago, which, however, ceased spontaneously. A year ago she had sharp renal colic, accompanied by fever and vomiting. Shortly after this pus was detected in the urine. Micturition was never painful. Since four months continuous pyuria and noticeable emaciation existed. Dr. Alfred Meyer found a lumbar tumor, and sent the patient to me. On admission a large, dense, non-fluctuating tumor was found in the right loin, which protruded into the hypochondrium, displacing the colon downward and forward. The urine was abundant, acid, had a specific gravity of 1016, and contained large quantities of pus and some albumin. June 10th, through the cystoscope a normal, pale vesical mucous membrane was seen. Furthermore, it was observed that on gentle massage of the right groin a cylindrical plug of pus escaped from the right ureter, the orifice of which appeared much congested. The left ureter appeared normal. Into this a catheter was introduced by means of Kelly's procedure. Sixteen grammes of urine were collected, that contained a few pus-corpuscles and traces of albumin. Hence it was concluded that the left kidney, though not perfectly sound, was not seriously involved.

June 15th the right kidney was exposed and freely incised. From the pelvis and from four calices large quantities of pus and several irregular shaped uratic stones were removed. The kidney and wound were drained in the usual fashion and dressed. Little reaction followed. The secretion diminished rapidly, and patient was discharged July 18th with a nearly closed wound. Her general condition had improved noticeably. October 7th she presented herself again, reporting that the wound, which had been closed for several weeks, had reopened a week ago, discharging a large quantity of pus. I found the lumbar tumor smaller than it was before the first operation, painless to touch; the general condition of the patient was very good, her urine acid and abundant, but containing much pus. I advised the removal of the kidney, which was done October 22, 1896, without accident. The kidney was found to contain six more abscesses, each harboring a stone. The renal parenchyma looked waxy, and was very much shrunken. By October 27th the urine became nearly normal, though still containing microscopical

quantities of pus.   November 20th the mass-ligature of the pedicle
came away, and December 15th the patient was discharged, cured.

The presence of morbid changes in the other kidney should not pre-
vent nephrectomy of a totally disorganized organ.   On the contrary,
the removal of such a pus-bag as was encountered in this case elim-
inates a continuous menace to the other moderately diseased kidney.

Resembling in many respects the preceding one, the following case
was nevertheless much more serious, on account of the extreme marasm
caused by a renal suppuration of ten years' standing:

*Calculous pyelonephritis of the right side; cystoscopy; nephrectomy;
cure.*—E. W. A., aged thirty-eight years, merchant, was admitted Octo-
ber 13, 1896, having come from the South.   He stated that twelve years
ago internal urethrotomy had been performed for rebellious gleet and
stricture.   This was followed by an acute cystitis, which had persisted
ever since that time.   He suffered for ten years, more or less, from peri-
odical attacks of severe renal colic of the right side, which were accom-
panied by chills and bloody urination.   In spite of a ravenous appetite
the patient had emaciated to a skeleton.   Since ten weeks his urine had
become putrid, and from that time on continuous fever, frequent chills,
night-sweats, and incessant lumbar pain, radiating toward the blad-
der and the right testicle, were present.   Urination was very frequent.
The physical examination showed excessive emaciation and light ana-
sarca of the feet; otherwise normal conditions; an accelerated pulse of
good quality.   In the right loin a large, sensitive, resistant tumor could
be felt, which descended to the level of the navel, and extended to the
median line.   The urine was foul, but acid, containing much pus, some
blood, and very large quantities of detritus; its daily quantity was about
fifty ounces; the temperature 100.2° F. in the morning, with regular
evening exacerbation.   October 14th cystoscopy was done.   The trigo-
num was found to be moderately congested, especially around the orifice
of the right ureter, from which a solid plug of pus was seen escaping.
From the left ureter clear urine was seen escaping at short intervals.
Catheterization of this ureter was not attempted.   The left kidney could
not be palpated.   The assumption was fairly justified that the left kidney
was sound.   October 15, 1896, the patient being chloroformed, the tumor
was exposed and easily separated from its lateral adhesions.   It repre-
sented a thin-walled sac from which the aspirator removed foul pus, and
within which a number of stones could be distinctly felt.   The cortex
appeared waxy.   A mass-ligature was placed around the pedicle and the
organ was ablated.   The wound was dressed in the usual manner.
During the first twenty-four hours following the operation fifty ounces
of urine were voided, which was nearly clear.   It had a high specific
gravity, containing a small quantity of pus and a little blood.   From
October 18th the temperature became normal.   The urine continued to
be abundant, and the patient's general condition, aided by his enormous
appetite, was rapidly improved, so that on November 15th he could
return to his home cured, having gained since the operation thirty-four
pounds in weight.

CONCLUDING REMARKS.   The surgical principle, to afford timely
relief from tension, and early to evacuate after an early diagnosis, made

in the presence of acute suppurative processes threatening the integrity of an organ, must find unreserved application in suppurations of the kidney. The earlier such measures are taken the more they deserve to be called truly conservative—that is, directed toward the preservation of the functional ability of the viscus. Nephrotomy done in the early stages of renal suppuration is a safe procedure, and ought to be done much oftener than heretofore, the indication being based upon the presence of suppurative fever, a renal tumor, and especially upon the voiding of a decreasing daily quantity of urine.

Secondly. As far as the indication is concerned for the performance of nephrotomy in the presence of acute non-suppurative forms of nephritis, Reginald Harrison strongly recommends early interference whenever, in the presence of an infection, albuminuria and appreciable painful renal intumescence can be demonstrated, from which the presence of increased renal tension can be deduced. He published in the issue of the *Lancet* of January 4, 1896, three successful cases of nephrotomy performed, respectively, in a case of scarlatinal nephritis, in one caused by influenza, and in another one following exposure to weather. These suggestive facts are mentioned here only to serve as a stimulus to further endeavor.

Neoplasms of the Kidney.

During the period comprised within the limits of this paper the kidney was twice successfully removed for neoplasms. Unfortunately in one of the cases relapse followed:

CASE I. *Alveolar sarcoma of the right kidney; extirpation; cure; relapse.*—D. G., aged five and a half years, was admitted June 13, 1896, to Mount Sinai Hospital. Her mother stated that the child had commenced to complain of right lumbar pain six weeks before, and that a peculiar hardness could be felt in the loin. No difficulty or pain in urination was observed, but the patient became pallid and lost flesh. On admission a large, smooth tumor could be felt occupying the right loin and hypochondrium, extending downward to the crest of the ilium, and projecting the width of four fingers beyond the median line. It was scarcely movable, and by inflation the colon was found to be displaced far downward and to the left side. The tumor could not be differentiated by percussion from the liver. The urine was absolutely normal, likewise all the other organs. June 19th the patient was chloroformed and the posterior aspect of the tumor was exposed by an incision beginning near the margin of the quadratus lumborum, and extending in an oblique direction downward and forward four inches beyond the median line of the abdomen. The peritoneal cavity was immediately opened and the collapsed intestines were packed away under hot towels. After this my first endeavor was to expose the renal vessels, as from their early occlusion I expected a considerable diminution of the otherwise dangerous and profuse hemorrhage. Accordingly, the peritoneum was stripped up from the kidney until the ureter and renal vessels were exposed. They were cut through between a double

ligature. A large portion of the peritoneum was so closely adherent to the mass that it had to be sacrificed. The most difficult part of the operation consisted in the separation of the upper portions of the mass from the under surface of the liver. A number of large veins communicating with the liver were torn through, and bled profusely. Artery-forceps being inapplicable, the bleeding surface was covered with an iodoform-gauze packing, by which the hemorrhage was perfectly controlled. After the kidney had been removed an appalling cavity lay exposed, in the bottom of which the vena cava could be seen bared to the length of six inches. An affluent vein of the size of a crow-quill had been torn out of the vena cava. The resultant defect was closed by a continuous lateral catgut suture of the vein-wall. While I was rapidly closing the peritoneal defect by a continuous catgut suture, and while the abdominal portion of the external wound was being closed by a number of button sutures, Dr. Lilienthal infused 1000 grammes of normal saline solution, this having become necessary by a threatening collapse. The wound was plugged with absorbent gauze brought out near the posterior angle, and was dressed. The patient was brought to bed with a thready pulse. Repeated attacks of collapse required constant vigilance and renewed energetic stimulation. During this period of depression, lasting until June 21st, the quantity of urine voided was decidedly below the normal, containing albumin, but no blood. Stools passed involuntarily, and the child's condition remained critical until July 15th. The apathy and depression gradually disappeared. In spite of the extensive abdominal invasion the child took and retained considerable quantities of strongly stimulating liquid food, and to this circumstance is to be ascribed her recovery. The sutured parts healed by the first intention. The large cavity contracted rapidly, and the patient's general condition improved visibly, so that she could be discharged cured September 6th. Unfortunately, a relapse became manifest toward the end of November, when the patient was presented to me with a rapidly growing tumor, occupying the lower surface of the liver. It was inoperable. She died in December. The pathologist reported that the tumor was an alveolar sarcoma.

The removal of this very large and, in its upper circumference, closely adherent tumor became only possible through the adoption of the plan of exposing and securing the renal vessels at the beginning of the operation. The principle of first securing the important vessels holding close relations to a large tumor, before attempting its extirpation, was first promulgated by Langenbeck.

CASE II. *Chronic pyelitis; endothelioma of the right, pyelitic kidney; frequent hæmaturia; cystoscopy; extirpation; cure.*—I. D., peddler, aged forty-four years, had been suffering for eight months from frequent exhausting hæmaturia, which had not depended upon any form of traumatism. An operation was proposed to him in October by Dr. Fluhrer, but was declined. On readmission, January 19, 1897, I found in the right loin of the anæmic and somewhat emaciated man a movable nodular tumor, which was not painful to touch, and did not fluctuate. All other organs appeared normal. The urine, voided in sufficient quantity, was acid, had a specific gravity of 1021, and contained much pus, a few

blood-corpuscles, and much detritus imbedded in glairy mucus. The left kidney could not be felt. January 22d cystoscopy was done. The vesical mucous membrane appeared normal. On massage conducted along the course of the right ureter the exit of a cylindrical plug of consistent pus could be observed from the orifice of the right ureter. The left ureter appeared normal, and the escape from it of clear liquid was repeatedly seen. The vermicular material gained from the right ureter came away through a catheter passed after the cystoscopy, and consisted of pus, mucus, and blood. January 26th, the patient being anæsthetized, the diseased kidney was easily removed through the usual oblique incision. · The vessels of the pedicle and ureter were separately tied, and most of the wound was closed by suture. The day after the operation the urine showed no traces of pus, but contained a few blood-corpuscles, and was abundant. Healing was uneventful, and the patient was discharged cured, February 28th. The pathologist's report on this specimen was: pronounced alveolar arrangement of the sarcomatous elements, which clearly derived their origin from the endothelium of the smaller bloodvessels of the kidney.

TECHNICAL REMARKS. Uniform preference was given to an oblique incision beginning from the twelfth rib near the margin of the quadratus and extending downward and forward well into the abdominal wall, the length of the incision depending upon the size of the tumor to be dealt with. Simon's vertical incision yields much less space, and, in the case of large tumors, must be supplemented by one or more transversely placed incisions. Extending the oblique incision well forward has the advantage that the reflection of the peritoneum is readily found, and its accidental injury can be easily avoided. Furthermore, by following the guidance of the peritoneum the ureter is found without difficulty, and a kidney occupying a high position, and hidden by the lower ribs, can be exposed and made accessible without additional resection of the ribs. The renal vessels can also be readily secured, which step commends itself as the initiatory one in the extirpation of large renal tumors. The abdominal muscles should be always reunited in the anterior two-thirds of the wound by button sutures. Where contamination by the accidental escape of pus is not present, and the ureter and vessels were tied separately with catgut, the entire wound can be closed by sutures, with the exception of the posterior angle, which is to be left open for the admission of a large drainage-tube. Should the wound become contaminated by pus, it is safe to employ a thoroughgoing and careful packing of all recesses with absorbent gauze. This can be withdrawn on the fourth or fifth day. Should the wound then be found clean and sweet, the employment of a secondary suture will materially shorten the duration of the healing-process. Should it be necessary to apply a mass-ligature to the pedicle of the kidney, a solid, cylindrical band of rubber, about one-sixth of an inch in diameter, will be found very convenient and safe. It will never

slip, and will cut through much sooner than a silk ligature.   Patients
should be encouraged to leave the bed as soon as possible.

Statistics.

Plastic of the ureter	1
Extirpation of the ureter	1
Nephrotomy	6
Nephrectomy	7
Of these were cured	10
Improved	1
Died	2

THE RELATIONSHIP OF OTOLOGY TO GENERAL MEDICINE.[1]

By Clarence J. Blake, M.D.,

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OTOLOGICAL SOCIETY.

Somewhat more than twenty-five years ago one of the first distinctly
special practitioners in this country made a statement in open meeting
to the effect that general practitioners were to be considered as the rank
and file, and specialists as the officers and staff of that army whose bus-
iness it is to fight, to conquer, and to limit the ravages of disease.   It
is needless to say that this proposition met with but little favor from
his hearers, and, notwithstanding the growth of specialism and the
division of the work done by the medical profession into parts, having
apparently often but very slight relationship to each other, it would
meet with no more favor to-day.   At the time when it was first made
specialism in medicine was a new, to many a dreaded, and to some an
abhorrent thing.   The general practice of medicine left the more minute
investigation of many organs and their diseases untouched ; bacteriology
was not, and aseptic surgery had not yet come to point the shorter path
to many a long-sought goal and cut the knot of many a medical problem.

With the experience of a quarter of a century, the simile between the
medical profession and an army can be only justly used by comparing
that army to a brotherhood, the members of which have each and all
equal, though different, functions, and if the general practitioner is to be
classed with the rank and file, the specialist is to be regarded, not as in
any way a superior officer, but as one of that rank and file sent out on
special service ; for, everywhere, the men who, with the foundation of
the general study of medicine, and, still better, in addition, the practical
study of general medicine as their base, go forward in any particular

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[1] Read at the Congress of American Physicians and Surgeons, Washington, May, 1897.

line of investigation, may be regarded as skirmishers sent in advance, whose duty it is, first of all, to observe, and, secondly, to report back to the main body the result of their observations, and thus to indicate the lines on which the main body may advantageously proceed. It stands to reason, therefore, that the specialist, in whatever line his duty may take him, must be not only an observer, but in some way or other, and to a greater or less degree, a teacher; and the extent to which these functions have been fulfilled, and these relationships of the interdependent parts of the medical community have been developed in the last twenty-five years, it is interesting to observe.

The establishment of the nine special societies which, in addition to the five others of more general purpose, make this august Association, is a striking evidence of the fact that within the period mentioned the growth of scientific medicine and the enlargement of its field of observation have so increased as to make it impossible for any one student to cover completely and adequately the whole ground; and we realize that it is, as always, the study of the infinitely little which establishes the immeasurably great.

Thirty years ago, with few exceptions, there was not a sufficiently large number of medical men engaged in any special branch of research to form a society. The first of the several special societies forming the present Congress of American Physicians and Surgeons was founded in 1864, and the others followed in the order given in the circular of this Congress.

Buried deep beneath the surface, approachable only through a narrow and somewhat tortuous canal, containing within itself an example of almost every histological structure to be found within the human body, the human ear had long been a favorite study of those older anatomists whose minute and painstaking investigations and whose delicacy of research were in keeping with the work of their artist contemporaries. As always, the anatomist lays the foundation-stone; and to Meckel, Valsalva, Eustachius, and Corti we are indebted for that knowledge which has made the study of diseases of the ear, both in itself and in its relation to general medicine, one of the most fascinating of its kind. For not only does the inaccessibility of the organ require, on the one hand, trained manipulation in the surgical treatment of its diseases, but, on the other hand, the reflex relationship of the ear to other organs in the body, its visible and sometimes elucidative participation in other diseases, and its multiple office as an organ of hearing, as a peripheral organ of equilibration, and also as a supplemental organ of space-perception, afford wide opportunities for that theoretical conjecture which is the appetite of research and the stimulus to scientific nutrition.

The mental processes which lead to effective results are always slow and concentrative, and in the brotherhood of scientific research some

one mind advances a little beyond the others; some one thought reaching out seeks the support of facts, and makes suggestions which other minds may slowly follow, and precisely as the study of the structure of the body long preceded the knowledge of its functions, and still further antedated the conclusions drawn from physiological investigation which laid the foundation of the art remedial and curative, so the simple device of a centrally perforated concave mirror enabling the observer to stand behind his reflex light-source lay unnoticed and practically unapplied, until at the end of fifty years it came into use in the hands of the clinician, and revolutionized, or rather, one might properly say, made possible the study of the diseases of the ear in the living subject as they are studied and treated to-day, and the time has now passed when a celebrated aural surgeon saw patients only on bright days, and others used either a concentrating lens or limited their manipulations to parts appreciable by touch.

In 1864, when, in answer to a question from a visiting surgeon, "Why are you going abroad?" a young hospital house-officer replied, "To study diseases of the ear," he was met with this statement, "All that you can do for the ear you can do with a syringe." At that time there were in the United States but four medical men whose knowledge of diseases of the ear went much beyond that indicated by the preceding remark, and these gentlemen were regarded by many in their profession as absurd in their claims as to the possibility of doing anything for ear diseases beyond leaving them to the *vis medicatrix naturæ*, with hope for the best results.

The study of diseases of the eye had at that time taken a recognized place as a branch of surgery and medicine requiring special education and special manipulative skill on the part of its practitioners, and departments in general hospitals, or special hospitals themselves for the treatment of diseases of the eye had already been established in deference to the demands of public need, and were receiving the recognition necessary to their perpetuation in the form of public or private endowment. To these institutions there came, either as the result of a popular appreciation of the need of special treatment, or as the result of a popular association of ideas, patients suffering also from diseases of the ear; for such patients no provision was at first definitely made in the clinics of the general hospitals or the outpatient departments of eye-infirmaries, and they came under the care either of the general surgeon, or were, not uncommonly, transferred by him to the eye-department, as one dealing with a branch of minute if not minor surgery. The aural clinic, without special equipment of its own, came to be, therefore, in the beginning, by force of circumstances, and by lack of knowledge of its possibilities, an appendix to the department or hospital devoted to the treatment of diseases of the eye, and it was not, in this country, until

ophthalmic clinics had already been established, that a definite appointment as aural surgeon was made upon the staff of any of our hospitals, or that any instructor in this branch of medicine was appointed upon a faculty in a medical school. Even then the specialty was slow in making its way to professional and public recognition, and the earlier records of investigation, as shown in medical journals, and the transactions of societies were those rather of physiological investigation and clinical observation than of advance along the lines of surgical procedure in which this specialty has since taken its justly allotted place.

The foundation thus laid, however, was one which, once established, permitted the erection of a superstructure of minute definitions, and the history of the growth of otology as a department of both medicine and surgery may be taken to include the following stages: *First*, the substructure of anatomical investigation, the study of the component parts of the machine, and their assembled relationships to each other; *second*, physiological research, the study of the machine in action, of the purpose of its individual components, and of their effective working relationship; *third*, as an outgrowth of these, the investigations of the pathologist into changes effected by diseases; *fourth*, and based upon these, the work of the clinician with reference to preventable cause and possible repair.

The earlier anatomical works contained elaborate treatises and many accurate illustrations of the anatomy of the organ of hearing, and it is, perhaps, to its concealment within the body, as well as to the entrancing minuteness of its structure, that we owe the interest evoked by it in the earlier students of anatomy, and it is quite understandable that, with but little knowledge of acoustics, the study of an organ so complicated should have led to an intimate investigation of its parts, without the knowledge of their value, at a time when mysticism ruled and the study of the black art constituted it a profession. It is not until the fifteenth century that we find the record of any accurate investigation with regard to that structure, in which Empedocles (400 B. C.) had discovered a snail-shaped body, which he considered as the real organ of hearing. The sixteenth century was especially rich among the Italian anatomists in minute and accurate investigation of this subject. Vesalius described the long process of the malleus, the Eustachian tube, the vestibule, and the semicircular canals. Ingrassia is probably entitled to the honor of the discovery of the stapes. Fallopius described the tympanic cavity, the two fenestræ, and their communication with the vestibule and the cochlea, and the communication of the mastoid cells with the tympanum, and gave his name to the canal through which the facial nerve passes to its point of exit below the ear. Eustachius described the intrinsic muscles, the tensor tympani, and the stapedius, gave a more exact description of that passage leading from the middle

ear to the throat, discovered by Vesalius, but called the Eustachian tube; while Casserius, of Venice, in the closing years of the sixteenth century and the first of the seventeenth, gave a more complete description than had been elsewhere previously published of the sound-transmitting apparatus of the middle ear, and the sound-receiving portion of the labyrinth.

How recent is our more accurate information in regard to the structure of the ear is shown by the fact that in the middle of the eighteenth century the discoverer of the fluid of the labyrinth, Dominic Cotugno, won such a reputation by his work upon the internal ear that he was called to the anatomical chair at Naples; while it was not until a century later, and within the memory of those who hear these words, that the first accurate description of the terminal sound-transmitting apparatus of the human ear was given by the Marchese Corti.

While specialization in medicine is no more definitely marked anywhere than in otology, the investigation into the relation of diseases of the ear to the study of general medicine is one which relieves it from a narrowness of interpretation which would be inevitable were it confined merely to the exhibition of manual skill in the limited surgical field at its disposal. The long training which alone makes the evidence afforded by inspection of the ear valuable, and which, therefore, sets the otologist apart in his field as an observer, brings about the necessity of a relationship between the aurist and his brethren in general practice, and in other fields of special research, which would not pertain were the information which he can afford, as the result of his acquired skill as a diagnostician, more readily within the knowledge of the body of the medical profession as a whole—a relationship which it is needless to say, in addition to subserving a general, beneficent purpose, has its value in the encouragement of that interdependence which is one of the great sources of the strength, as well as of the activity, of the medical profession.

In this sense one of the gifts of otology to general medicine may be said to be the interpretation of hidden things, nowhere more clearly shown than in the diseases of the ear occurring coincidently with the exanthemata of childhood, and in the review of the otological subjects of common interest, which makes the substance of this communication, it may very properly head the list.

That an acute congestion of the tympanic mucous membrane, resulting from closure of the Eustachian tube in the course of an acute coryza, may cause pain, general malaise, rise of temperature, and possibly nausea and vomiting in a young child, and that these symptoms may be relieved by the simple procedure of opening the Eustachian tube, are well known; but that these symptoms without pain, with excessive temperature, and evidences pointing to profound cerebral disturb-

ance, coma, and convulsions, may be due solely to the same cause, and entirely relieved by the same remedies, or by a simple puncture of the drumhead by means of a paracentesis-needle, is not as well known, and it is not until recently that we have come, in the profession as a whole, to realize the full importance of the stand taken by the late Dr. Edward H. Clarke, and quoted with approval by no less an authority than von Troeltsch in these words: "So necessary is a careful attention to the ear during the course of an acute exanthema that every physician who treats such a case without careful attention to the organ of hearing must be denominated an unscrupulous practitioner." [1]

The participation of the ear, also, in diseases of the pleural cavity in childhood, its implication during the process of dentition, and the serious general effect which the disturbance of so vascular and so sensitive a structure in intimate relationship with the brain may have as a complicating factor in some already serious general condition, make the investigation of the ear often a matter of grave importance; while, on the other hand, the demonstration of the fact that the ear is in no way concerned, and that its inspection gives the purely negative evidence of a healthy condition, may often help, by eliminating one possible factor of disorder, to the solution of a complicated problem in diagnosis, for it is especially in children, on account of the intimate reflex relationships of the ear, that that organ comes most frequently into question as a possibly causative or participative agent in other diseases.

"The great vascularity of the canal, the drumhead, and the middle ear in children favors the rapid course of an infective inflammatory process, and, in a child suffering from scarlet fever or measles, with other sufficient cause for rise of temperature and complaint of pain, a discharge from the ear is often, in default of the aural inspection which should be considered imperatively a part of the examination of all such cases, the first evidence of an implication of the ear."

The external auditory canal in the young child is principally cartilaginous, the bony canal, which in the adult forms the inner half, being formed partly by development of the osseous tympanic ring, and partly by the projection of the mastoid cells outward, forming the posterior wall. The facts that deficiency in bony development is not uncommon, and that the vascularity and delicacy of the soft tissues favor inflammatory invasion of the surrounding parts, emphasize the importance of keeping a strict watch upon all cases of diseases of the external and middle ear in children, a not uncommon complication to be borne in mind being the simple post-aural abscess, which, if not speedily treated surgically, results sometimes in extensive denudation of bone, superficial caries, and still more serious consequences.

[1] Perforation of the Membrana Tympani; its Causes and Treatment. AMERICAN JOURNAL OF THE MEDICAL SCIENCES, January, 1858.

The most frequent diseases of the ear in childhood are those occurring in the middle ear, either secondarily as the result of extension of inflammation from the external ear, or from the nasopharynx through the Eustachian tube, the latter by far the more common channel for the invasion of the middle ear, and the primary mechanical cause being usually either the simple congestion and swelling of the mucous membrane of the nose and nasopharynx, such as may occur in the course of an ordinary head-cold, the presence of the so-called adenoid growths in the nasopharynx, or the inflammation of the mucous membrane of this cavity, the Eustachian tube, and middle ear, incident to the course of the exanthemata.

In the first and second instances the middle ear is affected primarily as the result of the closure of the Eustachian tube, either by the swelling of its lining-membrane or by the pressure of the adenoid growth, the results being interference with the ventilation of the ear and with its blood-supply, and a congestion of the middle ear, which in coryza is usually more acute than in the cases where the pressure of the adenoid growth produces a static congestion. In the "earache of childhood," which is most commonly the result of a simple acute inflammation of the middle ear, attention must be directed not only to the organ specially affected, but to the nose and nasopharynx, and to the general condition of the child—a faulty diet, or faulty habits of life being often found to be the predisposing causes; while in the cases of adenoid growths early surgical treatment, thoroughly carried out, is the best remedial measure. One of several objections to the partial and frequently repeated operation without ether for the removal of adenoids is that, while the central growth may be thus disposed of, the region of the Eustachian tube, which needs especially careful manipulation, is left comparatively untouched, and while there may be satisfactory evidence of the establishment of nasal breathing, the passage of air through the Eustachian tubes to the middle ears is hindered by the presence of the remaining lateral portion of the adenoid growth; therefore, with reference to relief of the aural symptoms, the complete operation under anæsthesia, permitting thorough and careful manipulation of the tubal region, is preferable.

In the child the vascular anastomoses are large and numerous, and the divisions of the temporal bone do not assume their relationship of complete ossification until after puberty; the mastoid process, which subsequently forms the posterior wall of the osseous canal, and presents in its interior a mass of diploetic and pneumatic cells, the latter communicating with the middle-ear cavity, is represented in the young child by the mastoid antrum, in direct communication with the middle ear and immediately beneath the thin plate of bone, later known as the tegmen mastoideum, which forms the boundary between this and the cranial

cavity, while the sutura petroso-squamosa permits direct communication, through membranous connections, largely supplied with bloodvessels, between the lining-membrane of the tympanum and the meninges.

The importance of frequent objective examination of the ears during the course, especially in the acute stage, of scarlet fever and measles, is emphasized by the fact already stated, that the middle-ear disease, occurring as a complication of these affections, usually runs a rapidly destructive course, and by the further fact that aural symptoms, other than objective ones, unless unusually severe, are apt to be lost sight of in the consideration of the general condition of the child,[1] while the importance of bacteriological examination is nowhere better illustrated than in the fact that the Klebs-Loeffler bacillus has been found in a discharging ear long after it had ceased to be found in the throat.

Inasmuch as the ear is the channel through which a large part of the educational material is supplied to the brain during adolescence, the importance of testing the hearing and examining the ears of school-children is a subject which should command both the interest and the influence of the profession at large.

Everywhere the doctor, as is incumbent upon him from the high trust which he holds, and in the acknowledgment of the privilege which he has of being a doctor, is called upon more and more to exercise those duties of citizenship which have to deal with the questions of conservation to its greatest usefulness of the one piece of personal property with which each individual in the community is possessed from his birth, and the questions of public hygiene, of the perpetuation of health, and the prevention of disease, of the encouragement of healthy activity, and the utilization, as well as the protection, of the waste humanity which is a public charge, are making justifiably larger and more imperative demands upon the time and thought of the citizen-doctor.

The establishment of medical boards of supervision in public schools is one of the important opportunities afforded the medical specialist, for not only should the children be examined with reference to contagious diseases for the safety of those as yet uncontaminated, but they should be examined also with reference to their ability to avail themselves of the educational opportunities afforded. The truth of this proposition will be best appreciated by those whose study of school-children in respect to defects of sight and hearing will have shown them the unexpectedly large number of such children justly entitled to compensatory advantages.

" The generally received opinion that diminution of hearing in children in consequence of disease is rare, is a mistaken one ; indeed, in some

[1] The Relation of an Aural Service to the Needs of a General Hospital for Children. Clarence J. Blake : Medical and Surgical Report of the Children's Hospital, Boston, 1895.

localities the cases of disease of the ear exceed in number the cases of disease of the eye, and, moreover, they are apparently on the increase; the steadily increasing demands upon the mental capacity accompanying the advances of the times bring the defects of hearing more prominently forward, because they show themselves to be a decided hindrance to the better education of the child. The results upon its later mental development of a marked diminution of hearing in a child are, unless compensated for by other instruction, decided and permanent, affecting the understanding, the character, the self-confidence, and, at a later period, the ability of self-support—mental tools, the possession of which is invaluable, and the want of which can never adequately be supplied." [1] In this view it is certainly a matter of importance that more attention should be directed to the detection of partial deafness in school children, in order that proper remedial efforts may be made, or, in default thereof, proper compensatory advantages afforded.

Very nearly 25 per cent. of the patients attending our aural clinics are children under fourteen years of age; of this number 50 per cent. are the subjects of suppurative inflammation of the middle ear, and of this number 10 per cent. or more owe their origin to the exanthemata of childhood, while of the cases of deaf-mutism throughout the United States 27 per cent. have been the result of suppurative middle-ear disease in early childhood, and it is probable that the more thorough investigation, and the systematic examination of the ears of children in our deaf-mute schools, which it is to be hoped will some time be the rule, will show a still larger percentage of these cases.

Indeed, one of the duties of the American Otological Society, as representing to the profession at large its special line of work, is to urge that systematic examination of the ears of children in our deaf-mute institutions, which shall, in addition to throwing the needed light upon the etiology of this deficiency, give the individual opportunities for improvement not otherwise obtainable.

It is equally incumbent upon the members of the Society individually to give to such examinations their personal attention, and to this end the appointment of a competent aurist as a part of the staff of every considerable deaf-mute institution in this country would be an advantage; for, although the proportion of children in such institutions actually suffering from suppurative disease of the middle ear is probably not more than 5 per cent., the number of cases of partial hearing for some portion or other of the musical scale or of a vowel-tone perception is much larger than was formerly supposed, and in the schools in which the articulate method of instruction is pursued the utilization, and

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[1] Franciska Schaeling Thorn, 1872. Beiträge zu einer richtigen, leiblichen und geisti Erztehung gehörkranker kinder.

possibly the encouragement, of this tone-perception becomes an important factor not only in the patient's ability to interpret intellectually the substitute for sounds which is presented to him, but puts him on a better plane of communication with his fellowmen, by helping him to achieve a better articulation himself.

The surgery of the ear differs from special surgery of other portions of the body in the important respect of the wide range of manipulative skill required, from an exploratory tympanotomy done under reflected light, through a tube an inch long and less than half an inch in diameter, under the most exacting aseptic precautions, on the one hand, to an operation in a pus-cavity, including the thorough evacuation of the cellular structure of the mastoid process of the temporal bone, with the possible extension of the operative field to the cranial cavity, for the purpose of opening the lateral sinus, or evacuating a brain-abscess, on the other hand, and is certainly a field wide enough to awaken interest and fruitful enough to stimulate endeavor.

The progress which has been made in what may be called the minor operative procedures in ear diseases has come about as the result of a more intimate study of the structure of the ear on the part of the clinician, and a better adaptation of instruments to the end desired; and in this latter respect, as in many others, the aural specialist owes much to suggestions obtained from parallel lines of research, for the instruments necessary for the surgery of the middle ear are quite as delicate as those demanded for operations upon the eye, and the mechanical skill of the dentist has contributed much to the facility with which surgeons now treat diseases of bone.

The complicated construction of the temporal bone, and the number of important structures in contact with, or situated in very close relation to, the cavity of the middle ear, make the minute study of these relationships absolutely necessary as a preliminary to the adequate surgical treatment of its diseases, and what might well be made a text-book on the surgery and the surgical anatomy of the temporal bone yet remains to be written. Given in the adult a suppurative process in that bony cavity known as the tympanum, bounded by its outer wall of membrane which has been already punctured for the liberation of the contained and rapidly secreting pus, we have a possibility of the extension of the inflammatory process from the middle ear into the cavity of the mastoid bone, and thence of the passage of pus through some thin point in the wall of the mastoid cavity downward into the tissues of the neck, or inward into the cranial cavity, and there may be as the ultimate result of an inflammation starting in a cavity less than half an inch in its longest, and not more than a thirty-second of an inch in its shortest, diameter, a meningitis, a thrombosis of the lateral sinus, or an abscess of the brain. Professor Politzer, in one of his courses of lectures, was accustomed,

holding a temporal bone by its styloid process, and turning it slowly before the class, to say, " Gentlemen, the temporal bone has four sides, the outside is bounded by life, from which there comes through the opening of the external auditory canal one form of our appreciation of what life means; on the other three sides this bone is bounded by death." Dramatic as this statement was, it had the desired effect of a text in fixing the attention of the student, and it had, moreover, the merit of being, on further consideration and with a deeper knowledge of the subject, strictly true; for it is only necessary to place side by side the earlier records of autopsies which revealed an abscess of the brain, and the records of any considerable aural clinic to-day, with its list of successful operations upon the mastoid, the lateral sinus, and the brain, and to read the growing literature on the subject of otitic brain-abscess, to realize the gift in this respect of aural surgery to the profession, and the reason which the general surgeon has for respecting this special field, a gift which is, however, no more than an acknowledgment of favors received, for the whole success of the specialist in the surgery of the temporal bone is the fruit of the application of broad general surgical rules, together with special anatomical knowledge, to the solution of the critical problem; while the surgery of the middle ear in cases of suppurative disease is again that application of general surgical rules reduced to the dimensions of the cavity with which it has to deal.

The surgery of a suppurative process within the temporal bone which, beginning in the middle ear, has implicated the mastoid process and threatens contiguous structures, has to take into consideration, not merely the effort to save life, but also to conserve, so far as may be possible, the hearing-power, and to leave undisturbed the equilibrating function of the ear; but it has also to take into consideration the possibility of injury to important structures lying in minutely close relationship to the necessary operative field.

Under these circumstances it is a tenable proposition that no aural surgeon should undertake an operation upon the mastoid in a case of suppurative implication of that cavity without being prepared by his mental and material equipment to enlarge his operative field to any extent demanded, or without having, if he does not possess it himself, the necessary surgical assistance and counsel at hand.

The fact that it is easier for the aurist to learn to open the cranial cavity, and to operate upon the lateral sinus or the brain, than for the general surgeon to acquaint himself with the technical procedures of operation within the temporal bone and middle ear, is an argument in favor of leaving the subject of the intracranial complications of suppurative middle-ear disease where it now largely stands, in the hands of the special practitioner.

Of the diseases of the ear which come under the consideration of the

general practitioner, and which do not menace life, the first in the list is the so-called chronic catarrhal inflammation of the middle ear, which makes in the temperate zone about 30 per cent. of all the material ultimately referred to the aural specialist. Under the broad title of chronic non-suppurative diseases of the middle ear there lie hidden a series of changes in the soft tissues of the sound-transmitting apparatus which are still the subject of interested study and investigation; and one of the many fields of research open to the student of the future in otology is the further acquired differentiation of those alterations in structure, the result of disease, which interfere with the transmission of sound, and the etiology of which is often to be traced to a remote source. As an example of this may be taken the peculiar, and often puzzling, cases of variable hearing occurring in young women, who ultimately become very deaf to all sounds aërially conveyed. The great variations, occurring as they do, in girls soon after puberty, or in young women who were the subjects of considerable nervous and emotional strain, led, without other ascertainable cause, to the conclusion that these variations were purely of neural origin, and being merely symptomatic were to be disregarded or to be dealt with solely through attention to the general condition. A special study of these cases, however, through the aural speculum, showed, under conditions of the greatest hearing-impairment in many of them, a localized congestion of the tympanic mucous membrane, especially of the niche of the oval window around the stapes. This peculiar blush was found most commonly, periodically, in connection with the disturbance of the menstrual functions, or with other evidences of pelvic disorder, and, with the assistance of the gynecologist, it was found in the great majority of cases that there was either malposition of the uterus, erosion of its neck, or atresia of its cervical canal, and that the remedying of these defects had a very material and beneficial influence upon the localized circulatory disturbance and accompanying tissue-change in so important a portion of the middle ear as is the inner end of the sound-transmitting chain of bones.

Another example of the interdependence of the aurist and the general practitioner is shown in the cases of chronic non-suppurative middle-ear disease in which the deleterious changes in the lining-membrane of the tympanic cavity are furthered by general nervous over-strain, over-tire, and the coincident train of disturbances of nutrition. In these cases the local treatment of the ear is futile, or of but little and temporary benefit without careful attention given to general hygiene and to a consideration of the condition of environment of the patient, climatic or otherwise. The dependence upon local treatment alone in such cases is sometimes mischievous in its results, and at least fails of the benefit which might accrue from a broader view of the situation, and

emphasizes the importance of a consultation between the aurist and physician, who, as the family adviser, has cognizance of conditions which may have an important bearing upon the etiology and progress of the case in question.

The first tendency in specialism is to lay stress upon the special character of the investigation to be followed, and to emphasize its individuality; but, with the broadening of the study, its relation to and dependence upon general scientific research become more and more evident. Specialized specialism ceases to exist in proportion as it separates itself, and grows and broadens only as it keeps up its relationship with the main body; and here again the military simile may be employed, for the specialist, who, as a skirmisher exploring an unknown country, cuts himself off from the main body which is his support and to which he owes his allegiance, and who seeks to exist to himself alone, fails of that usefulness in the line of duty which is the invariable price of any existence whatever.

One of the most striking examples of elucidative work in otology is that which has had to do with the definition and explanation of the curious complex of symptoms of which vertigo is the most marked and incapacitating manifestation.

With the recognition of the ear as a peripheral organ of equilibration, and with increased knowledge of its reflex relationship to the sympathetic nervous system, the better definition of its blood-supply, and the differentiation of its vasomotor tracts, came an explanation of much that had been vague and mystifying in those cases of vertigo of sudden onset which had formerly been referred either to abnormalities in the circulation of the brain, or to disturbances of the digestive apparatus, as their amenable cause; and the advances made in the study of the physiology of the sound-transmitting apparatus and in the application of surgical rules to the treatment of diseases of the middle ear have brought to our knowledge the positive advantage of establishing still another differentiation, that of *aural* as distinguished from *auditory* vertigo.

It is now a recognized fact that an effusion or hemorrhage occurring in the labyrinth may affect the hearing or the balancing power, or both, of the individual to a greater or less degree, according to its location and extent, and that the symptoms, so far as equilibration is concerned, may gradually disappear, to be reawakened at a later period by general conditions which induce a suspense of vasomotor inhibition, and thereby a secondary irritation of the terminal nerve-apparatus. It is further established that a fixation of the sound-transmitting apparatus of the middle ear, by doing away with or decreasing the function of one of the outlets from the labyrinth for pressure exerted by dilatation of the intralabyrinthine vessels, favors disturbance of the nervous end-appa-

ratus by a less degree of circulatory pressure than would be possible were the elasticity of the membranes of the round and oval windows and the mobility of the ossicular chain unimpaired.

The records of aural clinics show an increasing observation of cases of suppurative disease of the middle ear in which pressure upon the stapes as the result of a new growth or of epidermal exfoliation causes a series of symptoms very closely resembling those of the so-called Ménière's complex, and in which vertigo plays a prominent and disturbing part. These cases are almost invariably relieved by the removal of the morbid growths or accumulations, and the consequent release of the labyrinth from extrinsic mechanical pressure, and constitute the class of what may be called the mechanical or aural vertigoes. For purposes of distinction the first series of cases just cited may be termed auditory or labyrinthine vertigo, and the second class may be considered as lying between these two extremes. Beyond this grosser differentiation it is possible to go into minute definitions as to immediate or reflex cause and effect, and to follow the subject into the domain of the neurologist, before it shall in any degree have received the attention in investigation which its importance demands; while the question of intralabyrinthine lesions as an accompaniment of diseases of the kidneys, of the digestive apparatus, of the pelvic organs in women, and of the constitutional diseases of which syphilis stands at the head of the list in the number of cases of labyrinth-implication, and of diseases of the internal ear in children, present problems toward the solution of which the general practitioner and the otologist may well take counsel together.

There is one other subject which should command the attention both of the aurist and the general practitioner, and that is what may be called the "fatigue of deafness," a common and often unestimated factor in the causation and persistence of neurasthenia, and one imposing upon sometimes feeble shoulders a burden which it becomes us to lighten, if we cannot lift.

It may be taken as an accepted fact, among other evidences of the bounty of nature as set forth in the construction of this temple of the body, that those of us who have normal ears start in life with double the amount of hearing absolutely necessary for the ordinary purposes of social communion, and it is therefore possible to lose one-half of one's hearing-power before becoming conscious of the loss. Under these conditions, where the daily ordinary use of the hearing is regarded as the standard of perfection, it is easily understandable that a chronic progressive disease impairing the hearing may become fairly established before attention is turned to the necessity for interference, with a view to prevention and repair, and it is therefore not unusual to find in the majority of the chronic progressive diseases of which the slow impairment of hearing is the important symptom, that they have by the time they come into the

hands of the aurist long passed the possibility of prevention, and have established a condition which can be in only a moderate degree repaired. The apparent hopelessness of many of these cases, the impossibility of effecting by the treatment more than a slight improvement, should be no deterrent to the honest and strenuous effort to ameliorate the condition of cases of this class, and it is in many of them that the general practitioner, the family physician, and the specialist can best work hand-in-hand, for the deleteriously causative and influencing factors in the general condition in these cases are so many, and the progress toward improvement so slow, that the local treatment may often be advisedly limited to that which the patient can himself effect under the observation of his physician, with occasional examination and suggestion from the specialist; and there is probably no class of cases, although coming under the care of the aurist, which is so likely to become the subject of what may be termed over-treatment, either surgical or medical, as the chronic non suppurative diseases of the middle ear.   It is especially in connection with these cases of slowly progressive impairment of hearing that the fatigue of deafness manifests itself.   Few intelligent observers outside of the very deaf themselves, or of those who have to deal much with persons so afflicted, can appreciate the profound exhaustion resulting from the effort to compensate for a deficiency in this particular line of communication with the outer world in the person whose perception of that mode of motion to which we give the name of sound was once made without appreciable effort, and who has, under conditions of impaired hearing, first of all to make an effort to hear, and, in default of hearing, an effort to appreciate vocal utterance by watching the motion of the lips of the speaker; and finally, in default, either through lack of perceptive power or through ability only to catch consonant sounds which are formed in front of the mouth, to solve the puzzle of the spoken sentence by filling in the missing consonant sounds, those imperfectly heard or inadequately seen, from the appreciated context of the sentence; so that where once understanding came without effort, three distinct and appreciable brain-efforts are required: the first, to hear; the second, to see; and the third, to understand.   In our estimate of the burdens of life, the consideration of which belongs especially to the ministry of the medical profession, we should, I think, all of us endeavor to estimate more justly as scientific observers, more kindly, perhaps, as fellow-creatures, the nervous strain, the restrictive limit to useful expenditure of energy, and the demand for compensatory consideration for the pitiably deaf.

It has been impossible within the compass of this address to do more than touch upon some of the points which make the relationship of otology to general medicine—a relationship which it becomes the practitioners of both to conserve and strengthen, with the purpose of keeping

the specialist from becoming narrow, and of giving the general prac-
titioner opportunities for gaining something more than a superficial
knowledge of this special line of work.

To this end the further establishment of obligatory courses in the
medical schools, with clinical lectures and instruction in methods of
diagnosis and treatment, with clinical conferences and a practical exam-
ination of the student at the close of the course, are among the sugges-
tions to be made; while for the graduate student in this country, as is
now the case abroad, systematic courses, including opportunities for the
study of the structure and development of the ear, its anatomy, its
bacteriology, and the pathology of its diseases, in addition to clinical
instruction, should be afforded.

The experience of teachers in this department of medical instruction
shows that more time is required to give a student the knowledge of
diagnosis adequate to his future uses as a general practitioner than is
required in almost any other branch of special medical study.

The inaccessibility of the deeper and more vulnerable parts of the
ear, and the minuteness of the objective field, with the changes in the
diagnostic picture presented during the ordinary course of any of the
more important diseases, and the variations incident to complications
which may occur, make accurate determination of the true condition,
except to the trained observer, often a matter of great difficulty.

The inducement which led the medical student of thirty years ago to
take up the study of diseases of the ear, because it presented a promis-
ing domain for original research, is as true to-day, with its widened
horizon, as it was then, and grows with the growing appreciation on the
part of the otologist that his study, in its demand for better preliminary
education in acoustics, better knowledge of pathology, with its sugges-
tions for future use, better knowledge of bacteriology in its relation to
diseases of the ear, and better knowledge of the general diseases in
which the ear may be implicated, is one which affords such great oppor-
tunities for scientific investigation and helpful usefulness as to make it
worthy of the earnest and unwearying devotion of a lifetime.

REVIEWS.

A System of Practical Medicine by American Authors. Edited
by Alfred Lee Loomis, M.D., LL.D., late Professor of Pathology and
Practical Medicine in the New York University, and William Gilman
Thompson, M.D., Professor of Materia Medica, Therapeutics, and Clinical
Medicine in the New York University, Physician to the Presbyterian and
Bellevue Hospitals, New York. Vol. I. Infectious Diseases. Philadel-
phia and New York: Lea Brothers & Co., 1897.

To attempt to estimate a work of serial issue by its first volume is
to hazard the charge of hasty conclusion. In point of fact, one could
not reasonably expect uniformity in such an undertaking. Neverthe-
less, the character of this work is undeniably stamped upon the section
under review, and can be expressed by no other term than comprehen-
sive. The barrier between exhaustiveness and prolixity has been
observed, and, excepting more or less historical matter, there is no su-
perfluous "padding" in these unusually elaborate treatises. Thus far
we are presented with a group of quite independent monographs, of
whose quality collectively too much cannot be said. The introduction
to the work leads one to suppose that this rule will prevail, and that
the work will be the complete presentation of subjects in their indi-
vidual bearing, rather than an attempt to combine and correlate them.
The growth of knowledge has already so determined the necessities of
the case that it is no longer necessary to apologize for a work which
deals only with practice and its foundations. Principles of medicine
are so broadened and dignified in recent years as to deserve separate
consideration, and a work is by no means incomplete which confines
itself to either. Hence, in the volumes to come, if the same adherence
to the practical and demonstrated is shown, it is but implied that the
equally high consideration of speculative medicine belongs elsewhere.

Proceeding upon this line, it is quite fitting that the subject of infec-
tious disease should be foremost. By far the most brilliant of the results
of modern scientific investigation are to be found here, and it affords a
striking introduction. No attempt is made to bring into this category
any of the diseases whose infectiousness is under any considerable ques-
tion, which seems wise and consistent. Other diseases of unquestioned
infectiousness, as, for example, pneumonia, are not included, perhaps by
reason of natural relations to other departments.

We confess to a fear that the discussion of pneumonia may be destined
to be as to its topographic rather than its toxic relations, and hence
would have welcomed it among the infections.

The opening chapters by Welch and Thayer are a full statement of
the subject of Malaria at this writing. The entirely new aspect which
this classical disease assumes in the light of modern research is intelli-

gibly described. It is gratifying to find that so eminent an observer as Welch favors the examination for malarial organisms without a stain in clinical work. This preference seems to be growing. The suggestion that temperature may be conservative is not new but pertinent, and serves to arouse the reflection that temperature *per se* has been altogether too much a *bête noir*.

It would be an occasion for gratitude if Thayer's crisp disposal of the subject of typho-malaria might end it for all time.

There is no excuse to enter into detailed criticism of these chapters. They are eminently satisfactory. Dr. Hamilton West discusses Dengue without a special feature, except that he modifies the statement that there are necessarily two paroxysms, and insists, of course, on the non-identity with yellow fever.

Typhoid fever, or, as he prefers, enteric fever, is given by Dr. J. C. Wilson about sixty-five pages of the closest clinical analysis. No discussion has come under our notice more painstaking. Our attention is here and there attracted by conclusions with which we are not in harmony. The relative prevalence of typhoid fever in wet or in dry weather is obviously determined by the factors in etiology in any particular locality, and is likely to be largely topographic. Communities whose infection occurs by reason of accidental flushing of sewage into the water-supply are notoriously more afflicted in seasons of flood. The possibility of infection without the typical intestinal lesion is admitted. The estimate of 30 to 50 per cent. fatality in hemorrhage seems much too high, unless the phrase "subsequent perforation and peritonitis" may be made to carry much of the odium. The loss of liver-dulness is not a safe clinical fact to tie to, in view of the various conditions in which it occurs. As usual, headache is set down as frontal, whereas the experiences of many agree that, while the frontal pain is usually present, the occipito-cervical pain is much more diagnostic. Proper emphasis is laid upon the atypical fever, concerning which most of the error in diagnosis arises, and consequent false conclusion as to therapeutics. Not enough stress is laid upon the fact that all the symptomatology becomes more or less atypical under the cold bath treatment, and that much of the literature descriptive of the "typhoid state" finds no illustration.

We second the emphasis laid upon disinfection of excreta, knowing well how inefficiently it is done.

A slip of the pen near the foot of page 210 makes poor water serve for good water.

The caution against fatiguing journeys after the onset of the malady is logical, but we think to be absolutely offset by manifest advantages in subsequent treatment if secured by the journey. The detail of treatment is admirably discussed, and invites no criticism except in respect to one question—alcohol. Possibly the text conveys an exaggerated impression of the reliance of the author upon alcohol as a routine. If it does not, we must seriously take issue upon this point. When one considers the element of toxæmia, the element of antitoxic effort, the element of elimination, and, further, the accumulating evidence that the relation of alcohol to these cardinal facts is either *nil* or unfavorable to the individual, we are driven from the time-honored position of reliance upon alcohol, and must relegate it to the class of emergency remedies, as to the merits of which much disagreement will be found.

Strychnine, to which many clinicians look with confidence, receives

but scant mention. The description of the bath-treatment is clear and calculated to encourage its use. One is inclined to differ from the view that the bath involves more labor. Nurses agree, so far as our inquiry has gone, that to accomplish the same results, even as to temperature, the bath is much less laborious than sponging.

A brief reference to the serumtherapy, properly non-committal, terminates the chapter. It is throughout a plain, full, instructive exposition of the subject.

Even this work, fresh from the pen of one thoroughly abreast of the time, is defective by the time it leaves the press. Since the edition, the Widal test for typhoid has arisen, been tried, and is rapidly taking its proper place as a diagnostic resource. Of course, of this there is no mention.

Considerable stress is laid upon hypodermoclysis and enteroclysis in the treatment of cholera. We welcome all practical suggestions looking to the utilization of this most rational procedure.

The chapter on Dysentery is remarkably fine. Dr. West has dared to classify clinically and with a clearness and conviction that carry one with him. His picture of coexistent or successive phases; his refusal to narrow his definition by single symptoms; his defence of calomel as a rational remedy, all go to stamp his effort as in harmony with the spirit of the work.

The relation of ptomaïnes to abscess of the liver opens a broad field, and is very lightly touched upon. The plates in illustration are superior.

Professor Wilson again gives a close description of Influenza. His position that it is a disease of short duration, but with long-drawn-out sequelæ, is perhaps correct. However, the continuance of a specific toxic agency to which the many different phases and stages of this serious disease are referable is beyond dispute.

An exhaustive study by Latimer of Cerebro-spinal Meningitis is of great value. His pathologic and bacteriologic data are abundant, and fortunately he is very conservative as to conclusions. He suggests what will appeal to all clinicians—a clinical meningitis without typical morbid anatomy—a typical morbid anatomy without symptoms. The logical tendency is to disassociate morphology from symptomatology, referring both to toxic causes. Upon this line much is yet to be said.

Pyæmia and Septicæmia, by Atkinson, are well handled. His discussion of the nature and relations of thrombosis is very clear. It is noticeable that he makes no allusion to lymph-thrombosis, in spite of the prominence which that subject has assumed in septic dissemination. No allusion is made to streptococcus antitoxin, possibly because of the recentness of its production.

The eruptive diseases are, without exception, carefully treated, and except for full commendation need little comment.

If we could only believe with Welch in the efficacy of sulphur fumigation, disinfection would assume a much simpler aspect. We do not find quite fully stated the very close diagnosis that very exceptionally has to be made between smallpox and chickenpox. One such case will last one a lifetime.

Robinson, in discussing Scarlatina, does not offer any explanation of the marked mitigation in severity in recent years, but generally his discussion is most satisfactory. Twice he uses the expression " scarlatinal rheumatism," which seems to be a misconception of the pathology as

recently accepted. It is hard to believe that the boiling of carbolic solutions effects enough good to offset their obvious disadvantages, or that it is necessary to resort to greasing of the skin.

The author quotes Wilson, of Philadelphia, as favoring the administration of chloral throughout the disease in doses sufficient to produce sleepiness without narcotism. Assuming that he is correct in quotation, it seems to be a plan open to decided objection and to be, on the whole, meddlesome.

We regret to note that the author is inclined to make his recommendations as to hydrotherapy less imperative, because of the objections from the family or friends. Is it not time to stop compromising with the truth out of respect to prejudice?

Diphtheria is treated in the full light of modern knowledge; a careful defence of serumtherapy is justifiable, considering how much opposition exists. The duality of croup is admitted, and, as it seems to us, justly weighed.

The subject of Tuberculosis, by Osler, is thoroughly treated, and, as usual, is systematic, definite, and judicial. The noticeable feature of his chapter is that it is quite up to date, nothing of importance being omitted.

The chapter on Syphilis is excellent, though not marked by any radical views. The generally accepted doctrines are adhered to.

Tetanus is well discussed from the standpoint of infection, and the serumtherapy fairly considered. It is clearly premature to say much about this treatment.

The volume under review is really a great work. No one can go to it without profit. If the volumes to come maintain this standard, it will be a source of great gratification that, coupled with the rising reputation of the surviving editor, the enduring fame of the great clinician shall have a worthy monument. H. B. F.

A PRACTICAL TREATISE ON DISEASES OF THE SKIN, FOR THE USE OF STUDENTS AND PRACTITIONERS. Fourth and revised edition. By JAMES NEVINS HYDE, A.M., M.D., Professor of Skin and Venereal Diseases, Rush Medical College, Chicago; and FRANK H. MONTGOMERY, Lecturer on Dermatology and Genito-Urinary Diseases, Rush Medical College, Chicago. Illustrated with 110 engravings and 12 plates in colors and monochrome; pp. 808. Philadelphia and New York: Lea Brothers & Co., 1897.

THIS work is so well and favorably known to the profession that introductory remarks are unnecessary. The present edition has been altered in many places to meet the requirements especially of modern pathology and treatment, and much new matter has been added to the pages. Thus, we note changes in the articles on hydrocystoma, seborrhœa, erysipeloid, follicular eczema, seborrhœic dermatitis, and new matter or chapters on dermatitis repens, hydroa vacciniforme, mycetoma, angiokeratoma, protozoan disease, and in many other instances. Much now antiquated matter has been eliminated from the former edition.

We are pleased to observe that the authors are especially conservative in the nomenclature and the classification employed, the latter being

mainly that of the American Dermatological Association. This fact renders the book of special value to students. The treatise may as a whole be regarded as a complete exposition of our knowledge of cutaneous medicine as it exists to-day. In addition it contains the views of the authors on all important questions relating to the subjects discussed, and we have no hesitation in stating that the teaching inculcated throughout is sound as well as practical. Everywhere we find evidences that the authors are cognizant of all that has been done in dermatological literature of late years, and they have been generous in the presentation of the material that is likely to prove permanent. The labors of American dermatologists in particular are fully recognized wherever valuable contributions have been made.

Much work has been done lately in the study of ringworm, especially by French and English investigators, with the result that a new field in mycology has been opened up, all of which is here duly considered and discussed. Drs. Hyde and Montgomery say that "it seems to be established that there are at least two distinct and unrelated forms (of fungus) capable of producing the appearance classed as ringworm: the *microsporon Audouini*, or small-spored fungus, and the *trichophyton*, a large-spored fungus. In London, Morris, Fox, Adamson, and others find the microsporon is responsible for more than 90 per cent. of all cases of ringworm of the scalp in children, and that it also occurs in some cases of ringworm of the body, and even in some of the suppurating forms of the disease (as kerion). The trichophyton is comparatively rare in London." This entire subject of ringworm, as developed by Sabouraud and others, is new and full of interest.

We recommend the book cordially, and desire to call attention to the fact that the subject is approached from a scientific standpoint, with full appreciation, however, of the practical therapeutical side of the matter. The diction and style are easy and agreeable. The reader, as page after page is turned over, involuntarily feels that no effort is required in following the authors. L. A. D.

THE YEAR-BOOK OF TREATMENT FOR 1897. A CRITICAL REVIEW FOR PRACTITIONERS OF MEDICINE AND SURGERY. By sixteen contributors. 8vo., pp. viii., 480. Philadelphia and New York: Lea Brothers & Co., 1897.

THIS is the thirteenth issue of this useful publication, and this fact may be accepted as evidence that it fulfills the objects that led to its inception and have justified its continuance. In a succession of twenty-five sections there have been incorporated at such length as seems consistent with the importance of each subject treated the best of the new things in medical art and science that have developed during the preceding year. Each section is, beside, prefaced by a brief summary analyzing the work of the year in the respective departments of medicine, and in many places editorial comments in brackets are incorporated in the body of the sections. That the selections have been judiciously made and the work well done is assured by the names of the several contributors, while the convenient form of the volume, the neat typography, and the fulness of the indices add materially to its usefulness.

A. A. E.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.D., LL.D.,

PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL
SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

Xeroform (Bismuth Tribromophenol).—DR. JOSEF GRÜNFELD states that this drug (1) not only possesses a powerful antibacterial action, but by combining with toxins and ptomaïnes renders them harmless, setting free bismuth, which makes insoluble compounds with these poisons; (2) it has marked drying and astringent properties; (3) it is also a deodorant, and therefore particularly useful for wound-cavities about the digestive or urinary tract; (4) it is not irritant either to wounds or to surrounding soft parts; (5) it relieves pain partly through its contained bismuth and partly through the protective covering which it forms; (6) it is non-poisonous, from 75 to 90 grains having been taken internally without harm; (7) it stimulates granulation-tissue and skin-formation, therefore shortening the period of cure; (8) it is hæmostatic. As a result of absence of pain and irritation there is but little or no general reaction subsequent to local disease in the majority of instances, and even severe operations are not followed by fever. In eczema from iodoform the result—complete cure in twenty-four hours—exceeded all expectation. In eczema madidans of mycotic origin the healing was rapid and sure. Externally this drug is used as a powder, in 10, 20, and 30 per cent. gauze, in ointment, in pencils, and in suppositories. The manner of use is similar to that of iodoform. The gauze can be sterilized at 230° F. In many cases irrigation of the wound may be omitted, the field of operation being cleansed with sterilized pads. To insure contact, all scabs, crusts, scales, pus, detritus, necrosed tissue, and blood-clots must be carefully removed. In support of the above propositions the author cites twenty-three instances of the use of the drug.— *Wiener medicinische Blätter*, 1897, Nos. 1, S. 6; 2, S. 26; 3, S. 43.

The Treatment of Chilblains—DR. F. W. FORBES ROSS applies the secondary current of the faradic battery from five to fifteen minutes, increasing the current gradually to high strength, the poles being in contact with the

affected area, having previously dipped the electrodes in a saturated solution of sodium chloride. The tissues are gradually blanched, commencing after about five minutes. The itching is completely and promptly stopped by the first application, and a second, one or two days afterward, usually suffices for a cure. Seldom, if ever, does a third or fourth application become necessary.—*The Lancet*, 1897, No. 3832, p. 425.

Antitoxin.—DR. E. BEHRING states that diphtheria-antitoxin, as such, is absolutely harmless when administered to man or animals in health or disease. In support of this proposition may be cited: (1) that blood-serum containing antitoxin in whatever proportion acts within the organism precisely as does blood-serum without antitoxin; and (2) that, although the antitoxin-content of serum has steadily increased, the severity and frequency of untoward symptoms have not increased. The antitoxin of choice is that purified from albuminous substances, salts, and by-products, concentrated to such a degree that the small dose can be largely diluted with water and yet not exceed the size of an ordinary hypodermatic injection, and, in addition, that it shall be a permanent dry preparation and protected from contamination in closed containers. Of great importance is the use of this substance in prophylaxis, conferring an immunity which, although temporary, is reasonably certain.—*Fortschritte der Medicin*, 1897, No. 1, S. 1.

The Antitoxin-treatment of Diphtheria.—DR. B. H. DETWILER believes that when this remedy is used within thirty-six hours of diphtheritic invasion there is a gradual fading away of the exudate, with immediate return of appetite and strength. In recent cases one thousand units are ample for the average case; some require a second injection, according to the elevation or depression of the temperature. While confident of the ability of antitoxin to destroy the bacilli in the circulation, he, however, prefers to use a 1 to 2000 solution of corrosive mercuric chloride locally or by spray, with calomel, until it acts freely on the secretions, in order to prevent reinfection. In case of failure it is believed that there is either an insufficient quantity injected or that the preparation is not reliable. Of his own cases, twenty-three in number, but one died, and that was a child of six months.—*Therapeutic Gazette*, 1897, No. 1, p. 1.

The Inhalation of Formalin.—MR. J. LARDNER GREEN considers that the most rational treatment of catarrh and other diseases of the respiratory tract is by means of germicidal remedies, the most direct mode being by careful inhalation of a gas or vapor. The best results have been obtained from the vapor of formalin, one or two drops being placed inside of a respirator. If the disease be in the acute stage, one drop diluted with water will suffice. If the vapor be too stimulating, the respirator should be temporarily removed from the face to dilute the vapor with air; a feeling of warmth and comfort will follow. The use of this method is strongly advised in the early stages of tuberculous consumption, when usually it will be found, on microscopical examination of the sputum, that the number of both the micrococcus pneumoniæ and also of the bacillus tuberculosis will be rapidly lessened.—*British Medical Journal*, 1897, No. 1822, p. 202.

Treatment of Pulmonary Tuberculosis.—Dr. Bertola has treated nineteen patients with the serum of Maragliano. From his observations he concludes that (1) it gives rise to no general or local reaction ; (2) it is well borne and without ill effects upon heart or bloodvessels ; (3) it lessens and subdues fever ; (4) it improves the general condition and increases, in nearly all cases, the body-weight ; (5) it possesses a specific action upon the tuberculosis, but should be administered for a long time.—*Therapeutische Monatshefte*, 1897, Heft 1, S. 37.

The Treatment of Intestinal Toxæmia.—Dr. Matthew D. Mann, in searching for an intestinal antiseptic, believes that naphtalin has met with the most favor. Bismuth subgallate, as well as nearly all of the agents which have been tried, has disappointed. Benzosol is worthy of a more extended trial. Practically, hydrochloric acid seems to give satisfaction, and in support of its use is the theory of Simon that the free hydrochloric acid of the gastric juice keeps intestinal putrefaction within limits. Very careful regulation of diet and attention to the general surroundings, environment, and hygiene of the individual are the best agents ; these include the proper ingestion of water, the use of massage, exercise, fresh air, and sunshine.—*Yale Medical Journal*, 1897, No. 4, p. 149.

The Treatment of Infectious Pyelonephritis.—Messrs. Bovet and Huchard give an instance of the successful use of subcutaneous injections of a saline solution of sodium chloride. They were dealing with pyelitis from repetition, which, after a chilling, passed rapidly into an infectious pyelonephritis with phenomena of general intoxication. These cases are by no means rare among the richer patients, whose occupation does not permit them to satisfy, at the desired time, the excretory functions of the intestine and bladder. If careful inquiry is made, it will be learned that their urine is almost always turbid, of a strong odor, and deposits mucus, often pus, and perhaps with a trace of albumin. With these patients, after a too copious dinner or a fatiguing ball they may be taken with a chill, which is followed by a fever, bilious attack, and pains in the lower limbs, which may suggest the onset of influenza or typhoid fever. The urine, upon examination, will be found to be diminished in quantity, dark in color, depositing mucus or pus containing a third, or less, of 1 per cent. of albumin and a notable proportion of urobilin. This deposit may already contain the germs of a latent infection, and needs only an opportunity to awaken a condition which leads to uræmia or other form of poisoning. Such an instance is reported in detail in which success followed the use of a seven *per mille* serum, both hypodermatically and by the rectum. The urine showed the following changes : (1) Increase from twenty to fifty and even sixty-five ounces. (2) The chlorides increased more than fivefold. (3) The albumin diminished to one-thirtieth of its original amount. The largest daily amount used hypodermatically was twenty-six ounces ; by the rectum it was sixty-six ounces.—*Bulletin Général de Thérapeutique*, 1897, 2 liv. p. 75.

Treatment of Gonorrhœal Cystitis.—Dr. M. Harovitz counsels rest in bed, avoidance of all local irritations, administration of morphine, codeine

rectal suppositories or of extract of hyoscyamus, use of local warm baths, forbidding of spices, alcohol, and carbonated waters, and the giving of laxatives. Priapism can be avoided by the bromides, with camphor or cannabis indica. For the cystitis itself, salol, in three doses of fifteen grains each, sodium salicylate or sodium benzoate is useful. Naturally the balsams, oil of santal, cubeb, and kava-kava are to be considered. If the digestion is excellent, balsam of copaiva, balsam of Peru, and oil of turpentine may be employed. Of importance is the use of infusions, as of uva ursi, quite likely on account of their diluting the urine. If there is delay in the disappearance of the symptoms, then, after emptying the bladder of residual urine, an injection of three ounces of a one *per mille* lukewarm silver solution will be necessary.—*Centralblatt für die Gesammte Therapie*, 1897, Heft 2, S. 65.

Treatment of Puerperal Fever.—Dr. A. J. Iwanoff presents an argument for the use of inunctions of gray mercurial ointment. Eight instances of its employment are cited, all of recovery. In general two inunctions only were necessary, each of a little less than an ounce of the ointment, the first into the skin of the abdomen, the second, an hour later, into that of the lower extremities. The inunction lasts an hour, and the residue of the ointment is removed with warm olive oil, the skin washed and dried with cotton and protected by waterproof dressings and flannel. Frequent washings of the mouth with a 4 per cent. solution of potassium chlorate should be made during the treatment and in some instances six-grain doses thrice daily given internally.—*Therapeutische Wochenschrift*, 1897, No. 4, S. 73.

The Treatment of Syphilis.—MM. H. Hallopeau and G. Bureau present the following formula for hypodermatic injection: mercury salicylate, 4; oil of vaseline, 30. The mercurial salt is fused, washed with boiling alcohol, dried in an oven, triturated in a sterilized mortar with the oil of vaseline, and then placed in a sterilized flask. The material should be freshly prepared and thoroughly fused, otherwise it will obstruct the needle during injection. They conclude that: (1) Intramuscular injection of this preparation is one of the best methods of administering mercury. (2) The pain to which it gives rise is bearable by the great majority of patients. (3) It never produces salivation. (4) Only with great rarity does it produce local suppuration (twelve times in 176,000 injections, Tarnowsky). (5) If, by fault of administration, the injection enters the veins, the symptoms of pulmonary embolism rapidly disappear, without serious consequences. (6) The treatment is remarkably active. (7) It is not contraindicated in case of albuminuria of syphilitic origin. The dose of the salt is one grain twice each week.—*Bulletin Général de Thérapeutique*, 1897, 1 liv., p. 15.

Concerning Suppositories.—Drs. L. Lewin and F. Eschbaum place as essential requirements of a suppository that (1) the drug shall be evenly disseminated through it; (2) rapidly and easily separated from it; (3) be as sterile as is possible; (4) be easily introduced; and (5) be capable of exact dosage. The cocoa-butter suppository fails in the first requirement because the drug is incorporated while the vehicle is liquid from the application, and during the cooling settles in the apex, so that this contains more of the drug than the base.

The glycerin-gelatin suppository presents the disadvantages of (1) being generally not sterile ; (2) the source of the gelatin is unknown and may contain improper substances ; and (3) the quantity of glycerin may produce local irritation. The agar suppositories are made as follows : the commercial agar is powdered and heated with twenty-nine parts of water in a bath until it becomes a gelatinous mass. The acidity is now neutralized by the addition of 1 per cent. of sodium bicarbonate, and the mass is ready for use. In practice, however, the powder is neutralized, the drug added to it, and both with the above amount of water transferred to a flask, which is tightly corked, heated over a water-bath, and the contents poured into the moulds. This method results in an even distribution of the drug through the suppository. —*Deutsche medicinische Wochenschrift*, 1897, No. 2, S. 20.

The Use of Iron in Chlorosis.—Dr. Israel concerns himself with the choice of this preparation. His preference is for the liquor ferri sesquichloridi, which, in the German Pharmacopœia, contains 10 per cent. of iron. This is administered as one drop in a wineglass of water thrice daily after meals, increasing by drops until the patient receives twelve drops daily. Thus given it is a refreshing drink, improves the appetite, and, if a glass tube is used, will not blacken the teeth.— *Therapeutische Monatshefte*, 1897, Heft 1, S. 21.

Bismuth Tribromophenol.—Dr. Charles Greene Cumston states that this compound is recognized as most active of all the groups of antiseptics : first, because it contains, besides 49 per cent. of bismuth oxide, 50 per cent. of tribromophenol ; and, secondly, because the latter is more antiseptic than phenol. The substance may be heated to 230° F., and therefore sterilized without decomposition. It possesses a large field of usefulness in surgery. In open wounds, those in which no infection has taken place, it will secure union by first intention. It appears to exercise a calming influence upon burns, like iodoform. In some cases of *pruritus localis sine materia* the itching was stopped by its application. When used after the curettement of tuberculous abscess or glands cicatrization was rapid. On account of the continual development of tribromophenol and bismuth oxide a wound will be kept in a perfectly aseptic condition, while the slightly irritating action of the former gives a fresh and healthy aspect to the wound. Since iodoform produces granulation-tissue it may be first applied, and later cicatrization can be accomplished with the bismuth product. In gynecological cases it appears to have a marked influence upon the regeneration of the epithelium. In no case did any toxic symptoms appear, although the drug has been freely used. It is strongly recommended as a safe and sure antiseptic, and in many respects superior to iodoform or other powders of this class.— *Boston Medical and Surgical Journal*, 1897, No. 2, p. 37.

The Serum-treatment of Malignant Growths.—Dr. W. H. Happel reports three instances, in the last of which there was central sloughing with peripheral increase, which shows rather conclusively that the action of the serum is local and due in great part to a limiting peripheral inflammation set up by its use. It does not, therefore, correct any dyscrasia. For this reason

large tumors will never give very good results, as it will be impossible to place enough injections about the periphery of the growth, in most cases, at intervals of time sufficiently short to destroy the growth before the latter destroys the patient. In fact, the practical disappearance of the growth and the simultaneous death of the patient have been observed sufficiently often to teach us that the cancerous dyscrasia may kill a patient under serum-treatment even while the tumor is palpably diminishing, and that, consequently, the serum-treatment should be strictly confined to absolutely inoperable cases and should not be employed while the knife can still be used. —*Albany Medical Annual*, 1897, No. 1, p. 21.

Picric-acid Stains.—M. Créquy, having made use of the picric-acid treatment for burns, has found that there remained an indelible yellow stain upon the skin. It has been suggested by Brun that for these stains upon linen a prolonged immersion in boric-acid solution suffices for their removal, but this is much less effectual for cutaneous stains.—*Revue de Thérapeutique,* 1897, No. 3, p. 85.

The Treatment of Recurrent Mammary Sarcoma.—Mr. A. Marmaduke Shield reports a single fatal instance of the use of the mixture of the toxins of the streptococcus of erysipelas and the bacillus prodigiosus. There was evidently no reason for the result either in the fluid or the method. A smart reaction followed the first two injections. After that these injections made in increasing quantities failed to have effect. After a week's interval severe reaction was again established. The injection caused undoubted shrinkage and apparent disappearance of the growth, but this seemed due purely to inflammatory action in a soft neoplasm rather than to any purely specific action of the fluid. At the necropsy signs of general pyæmia were present; secondary abscesses and infarcts were found in the liver, myocardium, kidneys, and right knee-joint. The growth beneath the clavicle was necrotic, and it was particularly important to note that beneath the site of the nodules which had disappeared there was some purulent infiltration of the thoracic muscles. In the secondary abscesses the staphylococcus aureus was found. This is noteworthy, as the original fluid was prepared from streptococci. In this instance the serious nature of the disease justified the employment of a perilous mode of treatment, which undoubtedly shortened life. Slater sums up this method in stating that the treatment with toxins is occasionally successful, but gives rise to severe symptoms.—*British Medical Journal*, 1897, No. 1822, p. 193.

Poisoning by Antipyrin.—M. Dalché reports an instance of an ulceromembranous stomatitis following the ingestion of fifteen grains of this drug. A month later, after the same dose, there were noted swelling of the mouth, bleeding from the gums, numerous ulcerations of the mucous membrane of the tongue, lips, and cheeks. Four weeks later, after a single dose of one-half this amount, there rapidly supervened an intense, acute coryza, swelling of the mouth, and an insupportable itching of the thorax, abdomen, and scrotum. Four days later ulcerations the size of a pea, covered with false membrane, were found upon the lips; the gums were bleeding and presented a

red border, but the tongue was free. The abdomen exhibited a purpuric eruption, which had commenced to fade, and upon the scrotum were three small but markedly painful ulcerations. The patient had been in good health until a few months before this observation, although for four years he had complained of hepatic colic, for which he had visited Vichy each summer. At his last visit sugar had been found in the urine, but no albumin. During the second attack, above noted, neither sugar nor albumin was found, but an excess of urates and phosphates. During the last attack there was no albumin, but over 3 per cent. of sugar, an excess of sodium urate, with normal amounts of urea and phosphoric acid. There were no disturbing symptoms of diabetes, as polydipsia or polyphagia, and his reflexes were normal.—*Bulletin Général de Thérapeutique*, 1897, 1 liv. p. 29.

MEDICINE.

UNDER THE CHARGE OF

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Recovery from Addison's Disease after Removal of a Tuberculous Adrenal.—OESTREICH (*Zeitschrift für klin. Med.*, Bd. 31, p. 123) reports the following: a woman, aged fifty-five years, complained for three or four years of gradually increasing, finally extreme muscular weakness, malaise, palpitation of the heart, shortness of breath, and œdema of the feet. For six months there were night-sweats, pain in the epigastrium, and vomiting Blood was never vomited. There was decrease in weight from ninety-eight to seventy pounds. Physical examination showed slight dulness and harsh respiration over the left apex. The sputum was free from tubercle-bacilli. In the stomach-region, lying directly on the spinal column, was a small, movable, firm, nodular tumor. Pressure over it brought on a characteristic attack of pain. There was slight dilatation of the stomach. On distending the latter the tumor could not be felt. There was free hydrochloric, but no lactic acid. The skin and mucous membranes were not bronzed. The diagnosis was retroperitoneal glandular tumor, and, being considered the cause of the symptoms, an operation was performed.

The tumor was readily found, in close relation to the aorta, so that at first it seemed possibly aneurismal. It was finally removed, leaving the aorta exposed for a distance of 8 cm. The other relations of the tumor were not accurately made out. The patient recovered in two weeks. All the symptoms disappeared after the operation. Eight months later she was well, weighed eighty-seven pounds, and was stronger than she had been for years.

The tumor proved to be a tuberculous adrenal, partly caseous, partly calcified, containing bacilli. The medullary part was almost entirely destroyed by the growth, but portions of the pigment-layer were present. The mass had a thick fibrous capsule, which, however, had not limited the spread of the growth, as there were fresh tubercles in the surrounding fat. After some general remarks, and a discussion of the diagnosis made, the author makes a plea for similar operations. The diseased adrenal can be more readily removed than a healthy one, being larger and more consistent, having a thick capsule, and the retroperitoneal fat being diminished. In such operations both adrenals should be exposed, their condition determined, and one or both removed, according to the indications.

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Surgical Scarlatina.—INGERSLEV (*Zeitschrift für klin. Med.*, Bd. 31, p. 171) reports three cases in which scarlet fever began in solutions of continuity of the skin, the patients having been exposed to other cases of scarlatina. In one case the virus was probably introduced through a paronychia and corresponding lymphangitis. In the other two, wounds from burns furnished the points of entrance. The symptoms in all the cases were characteristic, except as regards the throat-symptoms. In the first case the pharyngitis developed late and was mild; in the others there was only a mild efflorescence in the throat. The author suggests that if a careful examination of the skin were more frequently made in scarlatina with mild throat-lesions, cases similar to those now reported would be more frequent, a wound in the skin being easily overlooked.

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Alterations in the Kidneys in Atrophic Infants.—SIMMONDS has endeavored to throw more light on the cause of the renal alterations which various observers have found in infants with acute and chronic gastro-intestinal disease. He examined the bodies of sixty atrophic infants without intestinal catarrh, excluding also cases of lues, acute infections, severe suppuration, tuberculosis, and catarrhal pneumonia. In all cases the kidneys showed lesions in the parenchyma of various degrees of severity. These changes bore no relation to the severity of the atrophy, nor could they be explained by the medicinal treatment or by complications such as rickets or catarrhal pneumonia. The only constant change in all the cases was an exudative inflammation in the tympanic cavity. The author looks on this as the source of the renal degeneration, holding that large numbers of pathogenic microbes develop in the tympanum; that they or their toxins enter the circulation and so produce the degeneration in the kidneys. In many cases the same kinds of bacteria were found in the ear and the kidney. From these investigations the author concludes that the renal changes following gastro-intestinal disease may also be due to inflammation in the ear. —*Deutsches Archiv f. klin. Med.*, Bd. 56, p. 385.

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Gastric Mycoses.—SCHMILINSKY (*Jahrb. der Hamburg. Staatskrankenanstalten*, 1893–'94, iv. p. 388) reports some rare cases of gastric disease. One was a case of primary anthrax of the stomach. The patient died after four days' illness, without a diagnosis being made. Autopsy showed swelling and hemorrhagic infiltration of the bronchial and mesenteric glands. There was

swelling of all the mucous membranes of the stomach, with a number of blackish-red elevations, and a number of erosions in the pylorus. The cæcum contained small blackish-red elevations. Microscopic and bacteriological examinations of the glands and the foci in the stomach gave a pure culture of anthrax bacilli. These were especially in the lymph-vessels around the glands in the mucosa. The superficial lesions showed streptococcus only.

In a case of streptococcus infection after scarlet fever and diphtheria the stomach was found affected much as in the preceding case, but here the cocci were found in the submucosa especially. The cocci were partly in the lymphspaces, partly in the tissues.

In a third case, an atrophic infant a month old, a whitish elevation the size of a pin-head was found in the pylorus. The umbilical artery contained pus. The necrotic papule in the stomach contained a bacillus like the colon bacillus, partly in the tissues, partly in the arterioles. It is possible the umbilical stump was infected with fecal matter.

The Diaphragm-phenomenon of Litten in Pulmonary Tuberculosis.— DR. E. RUMPF (*Berliner klin. Wochenschrift*, 1897, No. 6) publishes an interesting analysis of the study of the diaphragm-phenomenon in seventy cases of pulmonary tuberculosis. He points out, in the first place, the possible causes of error, such as imperfect breathing on one or both sides, sometimes found in healthy subjects, and emphasizes the importance of deep abdominal breathing in testing the mobility of the diaphragm. His results in tuberculosis include many interesting details too lengthy to quote, but the most important feature may be summarized as follows: Litten's statements were confirmed, viz, that the motion of the diaphragm is normally visible between the seventh and ninth ribs, and has an extent of 6 to 7 cm. In tuberculosis, at least when it produces symptoms, variations from the normal are very frequent, but the existence of a normal Litten's phenomenon does not exclude tuberculosis. Out of the seventy cases the symptom was absent five times, in mild cases with the disease limited to the apices. In a sixth case it was absent, although there were remains of old pleurisy over both bases. On the whole, Litten's sign has only relative importance in the diagnosis of tuberculosis. Normal extent does not exclude the possibility of disease, and an abnormal diaphragmatic motion can occur in health or in various diseases. At most we can say that a normal movement excludes disease involving the greater part of the lungs. The phenomenon is useful in determining improvement in the breathing. The author found that the motion in some cases was doubled in extent during treatment. It may also be useful sometimes in detecting simulation. But the facts that the phenomenon does not correspond to the severity of the disease, that various diseases, and even such things as sex, obesity, habit, intelligence, and the inclinations of the patient affect its development will prevent Litten's phenomenon from being widely used in practice.

Idiopathic Dilatation of the Œsophagus. — RUMPEL (*Berliner klin. Wochenschrift*, 1897, No. 6) presented an interesting case of this kind before the *Aerztlicher Verein* in Hamburg. The patient was a man of twenty-five

years, who began to have vomiting after a severe attack of pneumonia.
There was pain on swallowing. The conditions resembled nervous vomiting.
On passing a tube 28 cm. into the œsophagus, 250–300 c.cm. of slightly alka-
line fluid were obtained. After pouring in weak blue litmus solution it was
withdrawn unaltered and in the same quantity as before. After manipulating
the tube for some time the patient was able to pass it into the stomach. It
was then possible to pass a thin tube into the œsophagus beside the tube in
the stomach, and wash out the two organs separately. Further experiments
showed that the dilatation of the œsophagus was diffuse and not lateral. The
reporter considered the condition due to a spasmodic stricture of the lowest
part of the œsophagus.

Degeneration of the Liver in Gastroenteritis.—Dr. Martin Thiemich

calls attention to a subject that has not been as carefully studied as its im-
portance seems to warrant. In fact, not only have some authors asserted
that the degenerative changes in the liver here referred to are of no impor-
tance, but a few have even denied their occurrence, or have mistaken the
drops of fat for " vacuoles." The author examined the livers in thirty-two
cases of gastroenteritis, with one exception from infants in the first year.
None of the subjects had symptoms of acute yellow atrophy. In nine cases
there was no fatty degeneration, or at most a few droplets in the periphery
of the acini, with well-staining liver-cells. In twenty cases the liver was
slightly enlarged or of normal size. There was fatty degeneration of moder-
ate degree, varying widely in distribution in different cases In some the
periphery was fatty degenerated, in others there was an area of degenera-
tion around the central vein, in others the distribution was very irregular.
The fat varied in size from the finest grains to large drops, distending the
liver-cells and pressing the nuclei to the sides. The nuclei were often de-
generated. In three cases the fatty degeneration was far advanced. The
livers were large, pale-gray, and of low specific gravity. Sections showed
total degeneration of liver-cells; in fact, so extensive was the accumulation
of fat that it was often impossible to say whether it was in the cell or not.
There were in such cases collections of small cells along the vessels. The
question whether the fat in these cases came from food could easily be
answered in the negative, as most of the patients took none in the last days
of life. Alcohol had not been used. The author shows the futility of try-
ing to determine in such cases whether the condition is one of degeneration
in the strict sense, or infiltration. The fact remains that the presence of the
fat in such cases is pathological, and the author inclines to the opinion that
the fat is deposited because the cells are diseased and their metabolic function
impaired. The cause of this he finds in an intoxication, either by bacterial
poisons, by products of intermediate tissue-change, or poisons from the food.
The importance of such processes in the symptomatology and prognosis of
intestinal disease is evident, but requires much further investigation.—
Beiträge zur path. Anat., Bd. xx. p. 179.

Presystolic Apex-murmurs.—Kasam-Beck (*Centralblatt für inn. Med.*,

1897, No. 6) has examined this subject in the literature and clinically. In
sixteen out of nineteen cases in which a presystolic murmur was audible in

the apex-region, there were symptoms of aortic insufficiency and mitral stenosis; but post-mortem examination showed no narrowing of the mitral orifice. In other cases with similar murmurs adhesive pericarditis was disclosed. Phear reported a similar case where only enlargement of the left ventricle was present. The author refers to the cases reported by Flint, Guitéras and Fischer, and also to a case of Picot, in which a presystolic murmur was ascribed to hysterical contraction of the papillary muscles. The author's own case, a man aged sixty-three years, complained of pain in the thorax spreading down the arms, and marked dyspnœa. There was venous pulse in both sides of the neck and in the thyroid and mammary veins. The apex-beat was in the sixth interspace outside the nipple-line, and very strong. The arteries were sclerotic, the radial easily compressible. The heart-dulness was enlarged in all directions. At the apex was a loud presystolic murmur with a dull first and a loud second sound. Over the tricuspid the first sound was dull, the second loud and pure. The second pulmonary sound was accentuated. The diagnosis was stenosis and insufficiency of the mitral valve, relative insufficiency of the tricuspid, dilatation and hypertrophy of both ventricles, arteriosclerosis.

Autopsy showed no stenosis of the mitral orifice, but relative insufficiency of both venous orifices. In the apex was an aneurismal dilatation the size of an apple. There was marked arteriosclerosis, affecting especially the vertical branch of the left coronary artery. The author explains the presystolic murmur by the change in the blood-currents caused by the aneurism. The absence of systolic murmurs is interesting.

Tabes Dorsalis and Movable Kidney.—Dr. A. Habel (*Centralblatt für inn. Med.*, 1897, No. 7) calls attention to the coincidence of these two conditions in Eichhorst's clinic. Aside from reports by Eichhorst and Brieger the matter does not seem to have been mentioned before. Since 1885, in the clinic named, sixty-eight cases of tabes were treated. Twenty-four of these were in women. In six cases, all women, there was movable kidney, in one case movable liver also. This proportion of cases with movable kidney is, of course, not remarkable in itself; but Habel rightly says it is remarkable in that the total number of cases of movable kidney among the women patients of the clinic was only 1 per cent. The author thinks it possible that tabes may favor the occurrence of movable kidney, and fortifies himself with the analogy of neurasthenia. He suggests that the condition may be due to emaciation or to a relaxation of the abdominal ligaments. The fact that movable kidney was found only in the women tabetics is not overlooked by Habel, but any possible objection to his argument is met with the true but remarkable answer that movable kidney is rare in men. The article is of value in calling attention to a matter not generally considered, but the author should tell us when he writes again on the subject how he explains the very large proportion of women tabetics in his series. His method of arguing might lead to the conclusion that floating kidneys cause tabes in women.

Paroxysmal Tachycardia.—Bunzel (*Prager med. Wochenschrift*, 1896, Nos. 28 and 29) reports the case of a woman, aged fifty years, who had rheu-

matism sixteen years ago, and who for two years has had attacks which begin with a feeling of heat along the back and a diminution of the size of the pulse. Then rapid pulsations begin in the jugular veins, and the head nods synchronously. The lung-boundaries and respiration are normal. The heart-dulness during the intervals reaches the middle of the sternum. There are loud diastolic murmurs in the apex and mitral areas. In the attacks the cardiac dulness becomes enlarged to the right and above; the pulse rises from 72 to 164; epigastric and hepatic pulsations appear, and a tone can be heard in the crural arteries. There is never œdema or alteration of the quantity of urine. In the attacks the urine shows cloudiness with acetic acid and potassium ferrocyanide, and numbers of oxalate crystals. The attacks occur without reference to eating, usually in the afternoon. They end suddenly with a feeling of palpitation. Ice locally, and bromides, do not influence the attacks, but caffein and digitalis seem to prevent them for some time. During the attacks the blood-pressure is low. Bunzel shows that one may explain the attacks by supposing, with Martius, there is a primary lowering of the tone of the heart-muscle, and that, as in Knoll's experiments, the sensory nerves of the heart are irritated and the irritability of the vagus lowered. On the other hand, the vagus might be inhibited by some other cause, and the frequent beats and consequent short diastole of the left ventricle cause congestion of the right ventricle and the veins of the general circulation.

The Larvæ of Flies as the Cause of a Chronic Pseudomembranous Enteritis.—Most cases in which insect larvæ have been thought to come from the intestinal tract have been of short duration, the larvæ found by accident, and their origin often doubtful. A remarkable exception is reported by HENSCHEN (*Wiener klin. Rundschau*, 1896, No. 33). A peasant, while bathing in a brook, drank some of the muddy water. He noticed later that the water was full of red insects. In two or three weeks he had abdominal pain and diarrhœa, without vomiting. The diarrhœa continued, interrupted by attacks of severe constipation. There were seven or eight pale watery stools daily, with masses of mucus sometimes many feet long. At times blood was passed. Usually larvæ were passed with the stools. Various remedies were used, but mostly only with the result of increasing emaciation. The most effective remedy was a combination of kamala, kousso, and male-fern. This caused the expulsion of large masses of larvæ, and was followed by long-continued relief. The larvæ were cylindrical, articulated, without feet, measured 7 to 16 mm. in length, and 1 to 2 mm. in thickness. The heads were black. The animals were lively and vigorous. The entomologist Aurivillius assigned them to a species nearly related to the common house-fly.

[It is well known that in certain species of flies the larvæ are capable of reproducing larvæ.]

Congenital Cirrhosis of the Liver in Syphilis.—MARCHAND (*Central-blatt für allg. Path.*, 1896, No. 7) reports a number of cases of syphilitic livers in infants. The most common change was the one in which there are irregularly distributed foci of degenerated liver-cells, with small-celled infiltrations. Such cases eventually lead to the distorted syphilitic liver. In

one case, however, the liver was almost normal in macroscopic appearance, but microscopically showed a widespread and intense round-celled infiltration in the portal capillaries. This form probably passes into a genuine hypertrophic cirrhosis in later life.

SURGERY.

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The Surgery of the Peritoneum.—MR. FREDERICK TREVES has devoted a great deal of time to the study of the peritoneum, and his observations have been an important factor in the development of the present advanced state of the surgery of this structure. We therefore naturally read with great interest his "review" of this subject (*British Medical Journal*, 1896, No. 1870).

Mr. Treves advocates the simplest possible technique in the preparatory details and during an operation. While not sacrificing any of the essentials, he avoids those extravagant measures that savor more of ostentation than a rational interest in the welfare of the patient. The author still retains his confidence in the value of iodoform as a part of the dressing of wounds.

The advance made in our knowledge of peritonitis has been mainly in an appreciation that all the varieties hitherto considered as different forms are due to infection and are practically identical in their consequences. The constitutional symptoms of peritonitis are due to septic intoxication, and in the fatal cases death is due to blood-poisoning. Great harm has been done in the past, the author believes, by what has been termed "the toilet of the peritoneum." In removing accumulations or tumors from the abdominal cavity every precaution should be taken not to disturb the peritoneum beyond the immediate area of the operation, by the appropriate use of gauze-pads, etc., so that extensive flushing or sponging will be unnecessary. Peritonitis not involving the "small intestine area," subphrenic, iliac, and pelvic, is apt to be localized, and the surgical treatment of the affection in these situations is very successful. If the "small intestine area" is involved, however, the inflammation spreads rapidly and evidences of profound constitutional poisoning precede the usually fatal issue. The results of surgical interference in these cases, Mr. Treves says, "at the best are not brilliant, and it is evident that the treatment of this terrible complication must still incline toward that desirable prevention which is better than cure."

The author still retains the term "perityphlitis." While he is perfectly familiar with the comparatively much greater frequence of primary inflammation of the appendix, the evidence before the profession warrants the assertion of the existence of true peritonitis due to primary ulceration of the cæcum. This does not refer to epithelioma, actinomycosis, or tuberculous disease, but to non-malignant, non-parasitic ulceration of the bowel. Those cases are also excluded in which perforation of the cæcum is secondary to an appendicular abscess.

Our knowledge of the etiology of this disease, the author states, has not been added to by the "exuberant analytical discourses of some recent writers." He advances the suggestion that the process is comparatively simple. "A catarrh leading to ulceration would appear to be the commonest factor, and it is this condition which precedes that stricture of the appendix which is so frequently discovered. . . . Foreign bodies, seeds, and fruitstones play practically no part in the etiology of perityphlitis." The very few instances of real foreign bodies found in the appendix have been mostly small shot, pins, fragments of nut-shell, and bristles. Very many of the concretions are wonderfully accurate representations of certain seeds and fruitstones, and in some cases only division of the foreign body will reveal its true nature.

The statistics of Miles F. Porter, which give the common death-rate at about 14 per cent., are quoted. These figures, the author states, must have been derived mainly from hospital cases. He would place the general death-rate for all classes of cases at about 5 per cent.; but it may reach 30 or 40 per cent. in those complicated with abscess.

The subject of a perityphlitic abscess, it is stated, is by reason of that abscess, in the majority of instances. cured of his trouble should he survive. Sometimes an abscess that has been drained closes, only to open again, or a sinus may remain unhealed; but a second "perityphlitis" is very rare in these cases.

In regard to the question of treatment Mr. Treves says: "I have no reason to alter the opinion expressed some years ago that in dealing with cases during an attack an operation is seldom called for before the fifth day. Terms too strong cannot be used to condemn the practice of immediate operation; by that I mean the exposing of the appendix as soon as the diagnosis has been made. There is no sound basis for this procedure in either the pathology or the clinical prospects of the affection. It is not to be disputed that a fatal attack may commence mildly, and that it is not possible to foretell the degree of an attack by its mode of onset. The course of perityphlitis is, however, not so erratic as some maintain, and careful observation of each movement of the disease is not an unreliable basis for treatment. It is true that some intense attacks end in death in forty-eight hours; but if the whole range of the disease be reviewed, it is safe to say, with precision of language, that these terrific phases of the malady are exceedingly rare on the one hand and are not difficult to recognize on the other.

"In such extreme examples an operation cannot be done too soon. The assurance that simple incision is attended by a death-rate of 18.18 per cent. is not an encouragement to operate as a matter of routine. I need not add that evidence or strong suspicion of the presence of pus indicates immediate

interference, and a like course is clear should the swelling continue to increase with no abatement of the fever and other symptoms.

" When an abscess is evident or suspected the locality of the incision must be determined by the area of dulness and of resistance. Should the wound be made too far to the inner side as to miss the collection and open the peritoneal cavity, that incision should be closed and a fresh incision made at a point where the evacuation of the pus within the enclosed area can be effected. The incision should be free; the abscess-cavity is gently examined as to its position and extent, and information obtained as to the situation of diverticula. These diverticula can be cautiously opened up with the finger. No elaborate search should be made for the appendix. Such search means risk to the frail abscess-wall, and to that often feeble barrier of adhesions which isolates the pus from the general peritoneal cavity. Continued trouble may follow from a retained concretion, and as such a substance is usually easily to be felt, it should be sought for and removed. Should the diseased appendix actually present itself, it can be ligated and taken away. The high mortality accredited to this operation depends, I cannot help thinking, upon a blind resolve to excise the vermiform process at all hazards. The operation is concerned with the evacuation of an abscess, and those cases do best in which the least is done, provided that a free evacuation of the pus has been secured. The cavity does not need to be squeezed; it does not call for irrigation nor for sponging out, and least of all for scraping. As for drainage, nothing answers better than the iodoform-gauze drain properly cut and carefully introduced."

The risk attending the removal of the appendix in the period of quiescence, first proposed by the author in 1888, has been in his experience less than 1 per cent., and is therefore less than that of a recurrence of the inflammation. In the majority of cases, however, the attack is single, but we have as yet no reliable figures on this point.

The very interesting paper concludes with the following rational statements : " The treatment of a diseased appendix involves no new surgical principle and calls for no labored inventions. The treatment of the abscess is based upon those great general principles which underlie the treatment of all abscesses, and the removal of the little organ demands no departure from those accepted procedures which belong to the common lore of surgery."

Excision of the Tarsus.—LAUDERER (*Cent. für Chir.*, September 5, 1896, No. 36) gives a new line of incision for reaching the tarsus and contiguous structures. The incision begins at the insertion of the tendo-Achillis and extends in the median line on the plantar surface of the foot down to the bone. It divides no vital structures, simply the fat, plantar fascia, and the flexor digitorum muscle in a line parallel to its fibres. The splitting of the tendo-Achillis upward will do no injury if it is necessary. By holding the parts apart with sharp retractors all the bones of the foot may be readily reached by the use of the periosteal elevator, and easily removed.

The position of the incision is very serviceable in the after-treatment, as drainage is good. A light antiseptic packing is useful to prevent the too early adhesion of the edges of the wound. The deformity produced is very slight and can be corrected by a thickened sole on the shoe. There is no

difficulty from the scar-tissue, as it contracts and sinks deeply and is consequently free from pressure.

A New Truss for Inguinal Hernia.—WALFERMANN (*Cent. für Chir.*, 1896, No. 15) describes a new truss having a long oval pad of inflated rubber which covers the entire inguinal canal. It is hinged to the spring surrounding the body, and so regulated by means of a spring and lock between it and the body spring that a continuous even and easily regulated pressure is exerted over the entire canal.

The author claims for it the following advantages :

1. Uniform pressure over the entire length of the inguinal canal, so that the anterior and posterior walls are firmly pressed together.

2. A backward pressure of the abdominal parietes, so that a convexity is produced on the internal aspect.

3. By this pressure the sulci on either side of the epigastric fold are effaced, and the intestines have no tendency to escape outwardly.

4. That it is possible so to regulate the pressure of the truss that minute variations may be obtained upon the area desired without exerting undue pressure at other points.

5. The motion made possible by the hinge and springs makes the pad conform to the body in all positions and under all strains, and the danger of pressure on the hernial contents, after they have slipped past, is thereby greatly lessened.

The Treatment of Acute Perforating Appendicitis with Diffuse Peritonitis.—FLODERUS (*Arch. für klin. Chir.*, 1897, Band liv. Heft 1) reports in detail a case of perforating appendicitis, with general peritonitis, in a patient twenty-five years old, which was successfully operated upon by LENNANDER one hundred hours after the inception of the disease, and about fifty hours after perforation had occurred.

The method of operating which is employed by Lennander in cases of suppurative appendicitis is an incision parallel to and a little above Poupart's ligament. Through this incision perfect drainage can be obtained in all cases, while in some it is possible to open retroperitoneally a peri-appendicular abscess. This incision also possesses the advantage of far less predisposition to hernia, as the motor nerves are not divided and the incision passes through the tendinous rather than the muscular portion of the abdomen.

In evacuating a peri-appendicular focus of suppuration great care should be taken not to infect the general peritoneal cavity. To this end the author covers the exposed intestines and the wall of the abscess with sterile compresses saturated in a physiological salt-solution. The pus should then be absorbed by small sterile compresses as soon as it shows itself in the bottom of the wound. If the pus flows in too large a quantity to be absorbed in this manner, the patient should be turned upon the right side, the median portion of the abdomen being compressed by an assistant. The pus is thus prevented from infecting the general peritoneal cavity. As soon as the pus is all out the finger is passed into the abscess-cavity and the cavity carefully cleaned with compresses.

The appendix is now sought out and removed as near to the cæcal origin as possible. In these cases of suppurative appendicitis the attempt to ligate the appendix and close the stump by sutures is unnecessary. It is better, as in the case reported, to place upon it a large hæmostat, which includes its mesentery, the distal portion of the appendix being removed. The hæmostat is removed three or four days later. There may arise later an intestinal fistula; but this is of little consequence, as it will close of itself, and may be of value in allowing the escape of gases and the consequent renewed peristalsis, as in the case reported. As soon as the appendix has been removed and all foci of suppuration, the skin is cleansed with a 1 : 1000 sublimate solution, the tampons are removed and the cavity carefully packed with iodoform-gauze. If the cavity is not too large to be easily drained, the corners of the wound may be united by a few catgut or silkworm-gut sutures.

The washing out of the general peritoneal cavity is only employed when there has been, in spite of all precautions, an escape of a large quantity of pus into the cavity or a general peritonitis is already present. If it is necessary, he employs a normal salt-solution at a temperature of about 100° F., using it until the returning water is perfectly clear. During the washing the pulse should be carefully watched, as collapse may occur due to a splanchnic reflex.

The after-treatment is of great importance, and consists in stimulation and feeding to keep up the patient's vitality during the acute stage and hasten the elimination of the poison. The method employed is digitalis for three days, followed for one week by camphor injections and the use of enemata of grape-sugar and brandy, which are the least irritating and best borne by the rectum, while they act reflexly upon the upper intestine, provoking peristaltic movements. Salt-solution transfusions are also to be employed, increasing the volume of the blood and its pressure and hindering the drying up of the tissues, which always occurs and which cannot be counteracted by the administration of fluids by the mouth.

The second indication, the removal of the poison, cannot be accomplished without the entire removal of the gangrenous appendix and the complete evacuation of the abscess-cavity. A further indication is the provoking of diuresis, which the heart-stimulants and transfusions tend to produce.

The peristalsis of the intestine must be restored as quickly as possible in order that it may empty itself of its septic contents. To this end he employs during the operation puncture of the intestines to allow the escape of the contained gases, and later the minute and frequently repeated doses of calomel, followed by a saline laxative. The same end is achieved by enemata frequently repeated and by the passage of a rubber tube up into the rectum, allowing the escape of flatus.

So long as the peristalsis is not complete no food is allowed by the mouth, the patient being sustained by the enema noted above. Since the pain following operation is due to a large extent to the meteorismus, it should be counteracted by enema and the use of the tube to draw off the gases. The author strenuously advises against the use of morphine, never employing it unless the pain is insufferable, and then only one dose of grain $\frac{1}{6}$. The morphine, by its action upon the bowel, prevents peristalsis and the discharge of the contained poisons and flatus.

The administration of morphine in the early stages of the disease only masks its symptoms and delays the diagnosis of perforation, and as each hour's delay before operation, after perforation, vitiates and lessens the patient's chance of recovery, morphine should never be employed, but the patient should be operated upon as soon as the diagnosis of perforation has been made.

Of sixty-eight cases operated upon in the clinic of Upsala there were six with diffuse and nine with fibrino-purulent peritonitis. Of the six, two only recovered, while of the nine all but one recovered, and this patient was operated upon in a moribund condition. This difference in mortality marks sharply the difference in prognosis between these two classes of critical cases.

Osteoma of the Patellar Ligament.—Lejars (*Gaz. Hebdom. de Méd. et de Chir.*, February 21, 1897) reports an interesting case of pure osteoma situated in the patellar ligament, between the patella and tuberosity of the tibia.   The tumor sprang directly from the ligament and had no connection with the patella or tibia.   It was about the size of a walnut and made up of compact osseous tissue.   Its removal was necessitated by its interference with the motion of the joint, which, although slight, weakened the joint.

The danger in its removal lay in the destruction of the patellar tendon ; however, by a subperiosteal dissection, the tumor was removed, and after careful suturing together of the remaining portion of the tendon union was secured with no loss of function.

Traumatic Hemorrhage into the White Brain-substance Cured by Surgical Interference.—Borsuk and Wizel (*Archiv für klin. Chir.*, 1897, Band liv. Heft 1) reports a case of hemorrhage into the white substance of the brain, followed by aphasia, hemiparesis, and Jacksonian epilepsy, which was cured by surgical interference.

After the removal of a clot from the dura and the relief of acute symptoms the patient had repeated attacks of Jacksonian epilepsy.   The reopened wound showed nothing abnormal, but a long hypodermatic needle passed deeply into the brain-substance drew out a blood-stained fluid.   The dura was then incised, the needle again passed, and at the point from which the blood-stained fluid was withdrawn a deep incision was made down to the white substance.   Bloody fluid and blood-stained contused white matter were removed, a strip of iodoform-gauze was inserted, and the wound sutured about it.   The strip of gauze was removed twelve days after the operation, and with it about a teaspoonful of blood-stained fluid.   The wound then closed and the patient made a complete recovery.

This observation leads to the following conclusions :

1. Extravasations of blood of traumatic origin can be removed from the brain-substance by surgical methods, as well as contused and destroyed brain-substance, and in the same manner pathological and circumscribed portions of brain-matter.

2. It is possible that extravasations of blood other than those of traumatic origin may be removed by surgical interference.

3. The brain does not resent surgical procedures more than any other part of the body.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

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Foreign Body Removed from the Larynx without the Use of the Mirror.
—DR. MAX THORNER, of Cincinnati, reports (*Journal of Laryngology, Rhinology, and Otology*, January, 1897) a case in which, with the aid of the Kirstein autoscope—practically a tongue depressor and nothing else—he removed from a young man a piece of chicken-bone nearly one and a half inches long, one end of which had seemed to be imbedded in the right ventricle, while the other end leaned against the ary-epiglottic ligament. This withdrawal had not even required the application of cocaine.

Suppurating Laryngeal Bursa.—An instance of this rare lesion was recently exhibited to his class by DR. E. FLETCHER INGALS, of Chicago (*Medical News*, 1897, No. 7), which occurred in a man, aged thirty years, and had been noticed only two days previously. It was about an inch in diameter, movable, and lying just beneath the skin between the notch of the thyroid cartilage and the hyoid bone. It was treated by withdrawal of the fluid and injections of a solution of carbolic acid.

Bacteriologic Investigation in Chronic Nasal Catarrh.—DR. EUGENE LARUE VANSANT recently read before the County Medical Society (*Philadelphia Polyclinic*, 1897, No. 11) a brief report of the results of a bacteriological investigation of the nasal mucus, with special reference to the presence of the Klebs-Löffler bacillus, in one hundred cases of chronic nasal discharge. This examination embraced one hundred and thirteen cultures taken from one hundred patients suffering with various forms of rhinitis; great care having been exercised to exclude all cases showing any of the well-known clinical signs of diphtheria. The bacilli of diphtheria were found in the discharges of twenty-six different patients, while three other patients furnished organisms closely resembling the bacilli of diphtheria.

Leaving out all consideration of the various other forms of organisms, other bacilli, cocci, diplococci, etc., it is remarkable that such a large proportion of diphtheria-bacilli should be found in these cases, taken as they come in an outdoor clinical service.

The diphtheria-bacilli were chiefly found in atrophic rhinitis, chronic purulent rhinitis, and nasal syphilis. In all the cases in which the diphtheria-bacilli were present the patients were in ill health; being listless, pale, and anæmic.

The result of future investigation with these cultures is promised in full at a later date.

The Relation of Diseases of the Nose and Throat in General Medicine.
—The Lettsomian lectures now being delivered before the Medical Society of London by F. DE HAVILLAND HALL (*British Medical Journal*, 1897, No. 1884) are upon diseases of the nose and throat in relation to general medicine, and, to judge by the first one, are worthy of serious consideration not only of the general practitioner, but of the "Charlatanoide" who rushes into a specialty without any practical experience in general medicine.

After indicating the method in which many infectious diseases gain entrance by the nose and throat, attention is called to the occasional injurious effects from operative procedures upon the mucous membrane of these structures during the existence of epidemics, especially upon such people as are exposed to infection.

The conditions of the nose and throat and their involvements are then discussed in connection with diphtheria, smallpox, varicella, measles, rötheln, scarlet fever, whooping-cough, influenza, enteric fever, and erysipelas in succession.

Correction of Saddle-nose by Insertion of Plates.—At a recent meeting of the Liverpool Medical Institution (*British Medical Journal*, 1897, No. 1884) MR. THELWALL THOMAS presented a girl, fifteen years of age, upon whom he had operated seven months previously for saddle-nose deformity due to disappearance of the nasal bones in childhood from congenital syphilis. A piece of celluloid, modelled like nasal bones and possessing a well-marked keel on its concave surface, was inserted subcutaneously and pressed into position, the keel fitting between the nasal processes of the upper jaws, the lateral portions resting on these processes. The incision was made on the left side and closed by horsehair sutures. The imbedded celluloid did not appear to cause any irritation, and had of course greatly improved the personal appearance. The device was adopted in place of the many osteoperiosteal flap methods that had from time to time been described, all of which left marked cicatrices elsewhere.

[Some six months ago the compiler inserted a perforated platinum plate to correct a similar deformity in the person of a young medical gentleman. The nose and upper lip were detached from the underlying structures by the method of Rouge; and then the plate, which was somewhat guitar-shaped, was fastened by means of a vertical pin in front, which was pushed between the remnants of the nasal bones, and one horizontal pin on each side, which was inserted into holes previously drilled into the nasal process of each maxillary bone respectively.

The patient has done well, and there has been no trouble from the plate, but for a long time there was marked anæsthesia of the external portion of the nose on the maxillary lines, which has only partially subsided, while there has been a constriction of the nasal orifices requiring the almost continuous presence of metal tubes to prevent atresia.

Curiously, one of the greatest comforts to the patient is the entire subsidence of a disagreeable nasal catarrh which had bothered him for many years.]

OBSTETRICS.

UNDER THE CHARGE OF

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The Influence of Neuroses on Pregnancy and Labor.—In *La Presse Médicale*, 1897, No. 29, TARNIER discusses the influence of hysteria, epilepsy, and chorea upon pregnancy and labor. He excludes eclampsia as a neurosis because he considers it a toxæmia.

As regards hysteria, in a small number of cases pregnancy influences hysteria favorably. Very rarely, hysterical manifestations disappear during pregnancy; occasionally the attacks are less, while sometimes, on the contrary, they are much increased. It has been found by LANDOUZY and others that in the majority of cases hysteria is aggravated by pregnancy. So far as life and death are concerned, hysteria does not seriously complicate pregnancy; it exerts no unfavorable influence upon the progress of gestation, as it neither provokes abortion nor premature labor. So far as Tarnier's experience goes, it is sufficient, when necessary, to use the bromides in these cases.

As regards epilepsy, in one-fourth of the cases observed the epileptic woman is uninfluenced by pregnancy; in another fourth the epilepsy is aggravated, the attacks being more frequent and more severe, while death may occasionally ensue from a series of epileptic convulsions. In the remaining half of the cases the epilepsy seems less severe during the development of the fœtus, the attacks being less frequent and less violent. Tarnier explains this improvement by the cessation of menstruation, which in many cases seems to provoke the epileptic attack. In some patients epilepsy appears during pregnancy, ceasing after delivery, but reappearing in subsequent gestation. Epileptiform paroxysms rarely occur during labor, and are readily controlled by chloroform.

A most interesting feature regarding epilepsy and pregnancy lies in the diagnosis of epilepsy and of eclampsia. It is necessary carefully to interrogate the secretions of the patient to make a positive diagnosis. Tarnier would rely upon bromide of potassium in epileptic pregnant patients, giving the drug in large doses, one to two drachms daily.

He also reports two cases of chorea complicating pregnancy. In the first, in three successive pregnancies, chorea supervened in each, the movements localizing themselves first upon the left, and then upon the right side of the body. The second case was one in which chorea developed during pregnancy, following a profound nervous excitement. The movements at first were limited to the left hand, but afterward became general; the patient declined treatment, and passed from observation.

Unlike hysteria and epilepsy, chorea constitutes a serious complication of pregnancy; the mortality has been variously estimated from 30 to 28 per

cent.; sudden death has been reported among these patients. In fatal cases death ensues from asphyxiation, the patients becoming paralyzed and often maniacal. In 20 per cent. abortion happens, or premature labor. Many of these women were rheumatic or chlorotic before pregnancy. The prognosis is always guarded, as the chorea may become severe and fatal. As regards treatment, those remedies usually given to choreic patients are employed successfully during pregnancy.

Acetone in the Urine of Pregnant Patients as an Indication of Fœtal Death.—In the *Centralblatt für Gynäkologie*, 1897, No. 16, KNAPP reports, from the German obstetrical clinic of Prague, ten cases of fœtal death at various periods of gestation, in which, upon the day of labor, acetone was found in the urine; this substance was also present during the three days following labor. Some of these patients were syphilitic, but the influence of syphilis upon the presence of acetone is not determined. Half of the cases reported had suffered from syphilis, or were syphilitic at the time of pregnancy.

To ascertain the presence of acetone Jaksch's method was followed; this consists essentially in adding to the urine nitroprusside of sodium, and then either caustic soda or potassa to alkaline reaction. Acetic acid is then dropped into the fluid until the characteristic purple or violet color develops.

The Bacteriology of the Genital Tract in Woman.—MENGE and KRÖNIG have recently published a volume upon this subject. (Leipzig, Arthur Georgi, 1897.) A review of this volume demonstrates anew the fact that the normal puerperal uterus is free from bacteria. In 19 per cent. of puerperal women who had fever, streptococci were present. So far as the streptococcus and staphylococcus of pus and the *bacterium coli commune* are concerned, they do not exist normally in the genital tract. The exact method of infection in many cases is hard to determine.

It is possible that bacteria endogenous to the skin may cause puerperal infection, if conveyed to the genital tract. The volume is of decided interest and merits the attention of those concerned in practical asepsis.

Pruritus, Vaginismus, Ovarian Irritation and Pernicious Nausea of Pregnancy Occurring in the Same Patient.—In the *Centralblatt für Gynäkologie*, 1897, No. 12, SCHAEFFER of Heidelberg, reports an interesting case in which a neurosis was perpetuated in spite of the occurrence of pregnancy; the patient first came under treatment for pruritus and vaginismus, and was considerably relieved by the dissection and complete removal of affected tissue. She next developed alleged pain over the left ovary, and shortly after this pregnancy occurred. She suffered during this time with excessive formation of acid in the stomach and most obstinate vomiting. She was finally carried to term, and had a spontaneous delivery; comparatively little pain was experienced during labor. After a sharp attack of diarrhœa, upon the eighth day, the pain in her left ovary disappeared. She subsequently made a partial recovery from the condition. The case is of interest as illustrating the temporary influence of pregnancy upon a neurosis, and also the

fact that neurotic patients suffer severely from gastric disturbance during pregnancy.

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The Cause of Eclampsia.—A further contribution to this involved subject is made by KOLLMANN in the *Centralblatt für Gynäkologie*, 1897, No. 13. Reasoning from the fact that the blood of eclamptic patients is unusually toxic, while the urine is often less poisonous than in many other cases, he has examined the blood to ascertain the presence of a poisonous body. He believes that globulin and the substances which result from its decomposition are largely concerned in the causation of eclampsia. Deficient excretion during pregnancy results in the gradual accumulation of this substance in the blood. He considers rapid delivery unnecessary unless nature has already begun the process. He lays especial stress upon the preventive treatment of eclampsia by suitable diet and stimulation of the excretions.

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Three Porro Operations.—In the *Transactions of the Obstetrical Society of London*, 1897, vol. xxxviii., SPENCER reports three Porro operations. The first was made upon a patient whose pregnancy had gone 299 days, and in whom fibroid tumors in the lower segment of the uterus rendered birth impossible. The patient was allowed to come into labor, and the head was forced strongly down into the fibroid tissue; the operation was performed under the spray. In order to check hemorrhage a pessary was placed upon the uterus and firmly pressed down; this device proved absolutely useless, and considerable hemorrhage ensued. It was difficult to extract the child on account of the firmness of the lower uterine fibroid segment. The child was asphyxiated, but revived. As the uterus did not contract, the wire loop was applied low down on the cervix, and the uterus amputated; it is stated that the patient probably lost about twelve ounces of blood. The patient made a good recovery, although her convalescence was interrupted by oozing from the stump, which required the use of sulphate of iron and of turpentine, and the application of a second wire loop. Nearly two months after operation the wound was perfectly healed. The patient nursed her child.

The second case was that of a primipara in whom an enchondroma of the pelvis rendered spontaneous birth impossible. The child survived the operation. The uterus was amputated above a wire loop. There was some oozing from the stump, and the patient died on the ninth day after delivery. On post-mortem examination interstitial nephritis and consolidation at the bases of the lungs were present.

His third case was that of a multipara who had epithelioma of the cervix; high amputation had been previously performed, and the vagina was closed by the cicatrix. Porro's operation was performed, and three years afterward the patient was free from cancer. The child survived. [It is difficult to understand the choice of Porro's operation in these cases when cœlio-hysterectomy with intrapelvic treatment of the stump and total extirpation of the uterus offers such excellent results. There can be but one reason with those familiar with hysterectomy for choosing Porro's operation, and that is the necessity for a rapid procedure. One of these operations consumed nearly an hour, and convalescence almost two months. In every particular, modern

hysterectomy before the commencement of labor, but at the period when pregnancy should normally end, is greatly to be preferred.—ED.]

The Changes in a Retained Ovum and its Appendages.—EDEN, in the *Transactions of the London Obstetrical Society*, 1897, No. 38, describes the changes which occur in a ripe and retained placenta. He also mentions those observed when the embryo is retained. His conclusions may be summarized in the statement that necrosis immediately begins, after fœtal death, in the body of the fœtus and the umbilical cord, the amnion, the extra-peritoneal chorion, and the *decidua vera*. In the placenta the maternal circulation is gradually arrested by thrombosis of the intervillous spaces. Necrosis of the various branches of the placental chorion occurs as they become shut off from the maternal blood, and fatty and calcareous degeneration is found in the necrosing tissues.

Lactosuria in Nursing-mothers.—Those who examine the urine of large numbers of pregnant and puerperal women not infrequently find traces of sugar, although no evidence of malassimilation or of diabetes can be discovered. This sugar is usually found to be lactose, and its presence is explained by PAVY (*Lancet*, April 17, 1897) as follows: he believes that in the case of nursing-mothers and cases of lactose formed in the mammary glands the lactose may be eliminated through the urine. This substance is to be distinguished from glucose by boiling the urine in sulphuric acid and applying the copper-test. It is curious to observe that it is only when a case of lactose is present that it affords a reaction in the urine. It is always abundant in the milk, but the tissues seem less capable than normally of breaking up this substance and eliminating it through the blood.

Pavy cites the case of a patient who was weaning her child because of dyspeptic trouble, accompanied by frequent micturition. The breasts were hard and lumpy, and the urine had a specific gravity of 1040, the copper-test indicating eight grains of sugar to the fluidounce. There was a family history of diabetes in the mother of the patient. The urine was of high specific gravity and lessened amount. Pavy found that the patient was drinking too little water, and that the sugar was lactose and arose from the cessation of nursing. The patient's diet was increased, and in a short time the sugar disappeared, the patient remaining in good health.

A Successful Cæsarean Section.—In the *British Medical Journal*, May 1, 1897, COUSINS reports the case of a patient at full term, deficient in mental development, with a lumbar curvature of the spine and a contracted pelvis. An unsuccessful attempt was made to extract the child by craniotomy. The situation of the placenta was diagnosticated by palpation before the uterus was opened. The womb was not lifted out of the abdomen, and sponges were placed about it to prevent the leakage of fluid. After the delivery of the child the uterus was closed with two rows of catgut stitches, and the hemorrhage arrested by pressure with sponges. The abdominal wall was united with three layers of continuous catgut and a superficial row of silk. The vagina was cleansed from clotted blood, and a tampon of iodoform-gauze inserted. The patient made an uninterrupted recovery.

GYNECOLOGY.

Hemorrhage due to Syphilitic Growth in the Cervix Uteri.—WOLTER (*Münchener med. Wochenschrift*, 1896, No. 20) reports the case of a woman who was infected by her husband and bore nine dead children. Six months after her last labor she began to have metrorrhagia, which became so profuse that she was in collapse. Examination through the speculum revealed a nodule on the right side of the cervix, extending upward into the canal; it bled easily on being touched. Under antisyphilitic treatment the patient was cured in three months.

Discission of the Os Externum.—ROSNER (*Centralblatt für Gynäkologie*, 1897, No. 8) describes a plastic operation which he has recently performed, the purpose of which is to maintain the patency of the os after discission. Lateral incisions are made with a blunt-pointed bistoury. Two narrow flaps of mucous membrane are then formed from the anterior lip and are turned into the angles and sutured with catgut, the raw surfaces left after removing the flaps being also closed. A strip of gauze is inserted into the cervical canal and between the edges of the wound, and the vagina is loosely tamponed. The gauze is removed in two days, and daily douches are given. Healing takes place in eight days, and the os remains permanently open.

MARS (*Ibid.*) has simplified the operation by first lifting flaps on either side of the os, then incising laterally, and simply restoring the flaps to their former position and suturing them as before described.

Ovarian Tumor with Cancer of the Cervix.—ZEISS (*Ibid*) reports the following interesting cases:

Case I.—A woman, aged fifty-five years, who had ceased to menstruate at fifty, had had hemorrhages and watery discharges for several months. On examination carcinoma of the cervix uteri was recognized, with an ovarian cyst the size of a child's head. Vaginal hysterectomy was first performed (a single clamp being applied to the left broad ligament), when it was found to be impossible to remove the ovarian tumor *per vaginam*, as it was solid. The abdomen was opened and the neoplasm was enucleated from the right broad ligament. The patient made an afebrile recovery, but had two fistulæ in the left ureter, which necessitated the removal of the corresponding kidney a year later. She recovered and remained in perfect health. The ovarian tumor was not examined.

Case II.—The patient, aged forty-five years, had had menorrhagia for

eight months, with pelvic pains, pressure on the bowel, and rapidly de-clining health. Diagnosis, carcinoma of the cervix with intraligamentous ovarian cyst on the left side. Total vaginal extirpation of the uterus was performed, the organ being firmly adherent. As the operation was long and difficult and the patient was exhausted, it was decided not to remove the cyst. The recovery was uneventful.

Congenital Displacement of the Kidney in the Pelvis —Müllerheim (*Ibid.*) reports the case of a woman, aged fifty years, in whom the uterus and rectum were displaced to the right by the left kidney, which was adherent to the sacrum. The congenital nature of the anomaly was proved by the absence of any evidence of inflammation, the normal arrangement of the renal vessels, and the shortness of the ureter. The practical importance of this anomaly was demonstrated by cases in which rupture of the parturient uterus has been caused by the dystocia due to the displaced kidney. Others have been reported in which the organ was mistaken for an ovarian tumor.

This condition, which is due to faulty development of the Wolffian duct, is to be distinguished from movable kidney, in which the organ was orig-inally in its normal position. Dystopia of the kidney is really the result of an arrested development, the organ remaining in the position which it occu-pied in the embryo. Accompanying congenital defects in the uterus and adnexa are quite common.

Pelvic Hæmatocele Associated with Cancer and Tuberculosis.— Gardner (*Montreal Medical Journal*, January, 1897) reports two cases which he regards as unique in his experience. Whether the vascular changes leading to the effusion of blood were the result of the malignant disease or simply coexisted with it was not certain. In one case abdominal section was performed for adenocarcinoma of the ovary, in the other for tuber-culosis of the tubes. There was no evidence of ectopic gestation in either instance.

Operative Treatment of Pruritus Vulvæ.—Dirner (*Centralblatt für Gynä-kologie*, No. 5, 1897) reports the following case: a multipara, aged sixty-five years, who had reached the climacteric twenty years before, had suffered for three years with itching and burning of the external genitals so severe that she was unable to sleep. The clitoris and labia majora were dry and cracked. There was no sugar in the urine. As medicinal treatment failed to give relief, the writer excised the affected tissue according to Sänger's method, from the mons to the fossa navicularis, including the clitoris, the wound being closed with sutures of silver wire and covered with iodoform-collodion. Primary union occurred, and the patient was discharged cured at the end of two weeks, the itching having entirely ceased.

The writer believes that pruritus vulvæ, when due neither to diabetes nor to the micro-organisms present in an irritating vaginal discharge, is really a dermatoneuritis, as described by Sänger, due to subacute inflammation of the papillæ and fibrosis of the bodies of Pacini, Krause, and Meissner, and can, as a rule, only be cured surgically.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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Bacteriuria in a Child.—Under this title CLOPATT, of Helsingfors (*Revue Mensuelle des Maladies de l'Enfance*, October, 1896, p. 480), reports a case observed in a delicate girl of five years. Six months before symptoms referable to the bladder were observed she had suffered from a persistent diarrhœa lasting for two months. This was shortly succeeded by pertussis, which had reached the stage of decline when it was noticed that she had irregular evening rise of temperature with vomiting, independent of the paroxysms of her whooping-cough. Attention was now directed to the urinary organs by the fetid odor arising from the urine. Examination of the external genitals showed no disease, but urine drawn by sterilized catheter had a fetid, almost putrid odor, showed an acid reaction, and was cloudy but not opaque in appearance. After repeated filtration the liquid became clearer, but still showed a cloud when shaken. Microscopically, few leucocytes were found ; but numerous freely motile rod-bacteria, which proved to be the *bacterium coli commune*.

Under daily lavage of the bladder with solutions of nitrate of silver, varying from 1 to 2000 to 1 to 1000, the urine became clear, free from odor, and sterile in about two weeks.

In this case the etiology is obscure, but it is probable that the attack of enteritis was responsible for the infection, since the bacterium coli commune existing in the liquid stools might readily reach the bladder through the urethra in a female.

It is remarkable that the colon-bacillus, which is in general pathogenic for the urinary tract, could be present in the urine in such a concentrated form without provoking cystitis. Krogius believes that the lack of conditions affecting the integrity of the mucosa of the urinary tract, such as would be caused by retention of urine or by calculus, accounts for the harmlessness of the bacterium in such cases, and that patients suffering from bacteriuria are especially liable to cystitis if exposed to unfavorable influences affecting the urinary tract.

The author advises antiseptic lavage, especially for children, since he believes that so dangerous a drug as salol could not be safely given in doses necessary to prevent the further development of the bacterium.

Presence of the Loeffler Bacillus after Ablation of the Tonsil.—LICHTWITZ (*Société de Biologie*, March 9, 1896) has made cultures of exudates formed upon the surface of the wound after ablation of the tonsil by the electrothermic loop, and in eleven out of twenty-seven cases he has found

the Klebs-Loeffler bacillus; in two cases the bacillus was present alone, and in nine was associated with the staphylococcus, streptococcus, leptothrix, or micrococci. With the sixteen other patients there were no diphtheria-germs, but divers other micro-organisms. The condition of those patients bearing the Loeffler germ differed in no respect from that of the others, and in all of the cases the wound healed equally well without the need of spe-cific medication in the diphtheritic cases.

Putrefaction of Proteids in the Stomach.—Though much attention has been paid to the fermentative changes in the carbohydrates which are met with in the stomach, but little study has been given to the abnormal fermen-tative or putrefactive process which occurs at the expense of the proteids of the food. Among the products of this process hydrogen sulphide, H_2S, is not infre-quently met with and is particularly disagreeable because of its offensive odor.

A case of this type, in which hydrogen sulphide putrefaction was a prominent feature, has been carefully studied by STRAUSS—*Berliner klinische Wochenschrift*, 1896, No. 18. Bacteriological examination of the stomach-contents disclosed the presence of a germ corresponding closely to the char-acters of bacillus coli communis—it grew characteristically on gelatin and agar, produced gas and acid when grown in sugar-broth, coagulated milk with pro-duction of acid, produced indol in sugar-free broth, and on potato formed a somewhat brownish, abundant growth. It was furthermore ascertained that bacilus coli communis regularly produces hydrogen sulphide in detectable quantity when grown in an abundant amount of ordinary agar or in pepton-water, and in pepton-broth in an atmosphere of hydrogen.

The symptoms of the case varied somewhat, and it was found that a pecu-liar relationship existed between the production of hydrogen sulphide and lactic acid formation. At the beginning of the illness, when the symptoms were severe, hydrogen sulphide was present in considerable quantity, but no lactic acid was detected; but later, when the symptoms had subsided somewhat, lactic acid was present, while hydrogen sulphide was not found. In seeking an explanation of this fact it was found that the addition of grape-sugar to stomach-contents undergoing the hydrogen sulphide fermentation brought this quickly to an end with a coincident abundant formation of carbon dioxide as the result of fermentation of the sugar. This suggests, of course, that in the sugar the bacillus coli finds a more easily assimilable food than in proteids, and we have thus an explanation of the well-known fact that the adminis-tration of carbohydrates tends to lessen proteid putrefaction in the stomach.

INDEX.

17

2)

If you have a case of

Anæmia

or of any condition of waste and debility use

Protonuclein.

Protonuclein as a tissue builder is without an equal. It stimulates the nutritive functions, increases resistance to disease, promotes glandular secretion, restores tone to the system; cell life throughout the organism is stimulated and health augmented.

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AFTER THE GRIP, WHAT?

Few diseases are marked by such tedious and unsatisfactory convalescence as is the one known as epidemic influenza. After the acute symptoms have passed away, extreme weakness and prostration remain, persisting for a long time in spite of the ordinary modes of treatment. The patient is left in a condition of general debility altogether disproportionate to the apparent gravity of the affection. Vague neuralgias and mental hallucinations occur, together with an unaccustomed liability to contract other diseases with very slight exposure, or to suffer relapses of this disease. If the patient be a brainworker he finds it especially difficult to apply himself to his usual tasks. Either physical or mental exertion is followed by profound exhaustion.

Let us now look into the actual condition present, and then we can more intelligently seek an appropriate remedy—not merely a temporary palliative.

The patient has just passed through a serious and violent disease which, although of comparatively brief duration, has profoundly affected the great nerve centers, and from which they naturally can recover but slowly. Through excessive weakness of the nervous supply of the vital organs, their functions are but feebly and imperfectly carried on. How many there are who date the beginning of a permanent state of decline to their attack of La Grippe.
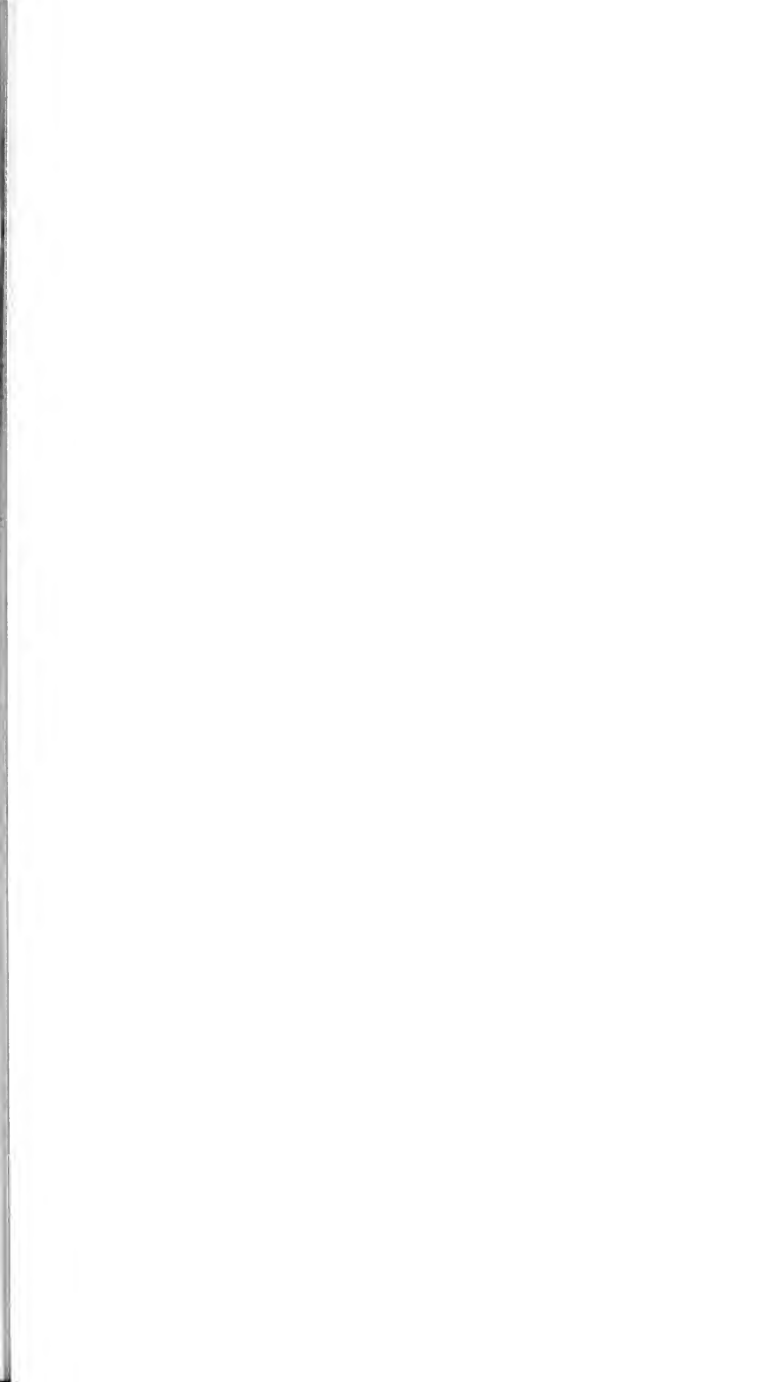
The ordinary tonics—iron, quinine, strychnine, &c.—seem utterly unable to cope with this condition. In fact, it is not stimulation that the patient needs, as by it he is only led to overtask his strength, and finally finds himself completely broken down. He needs a reconstruction of the worn out tissues.
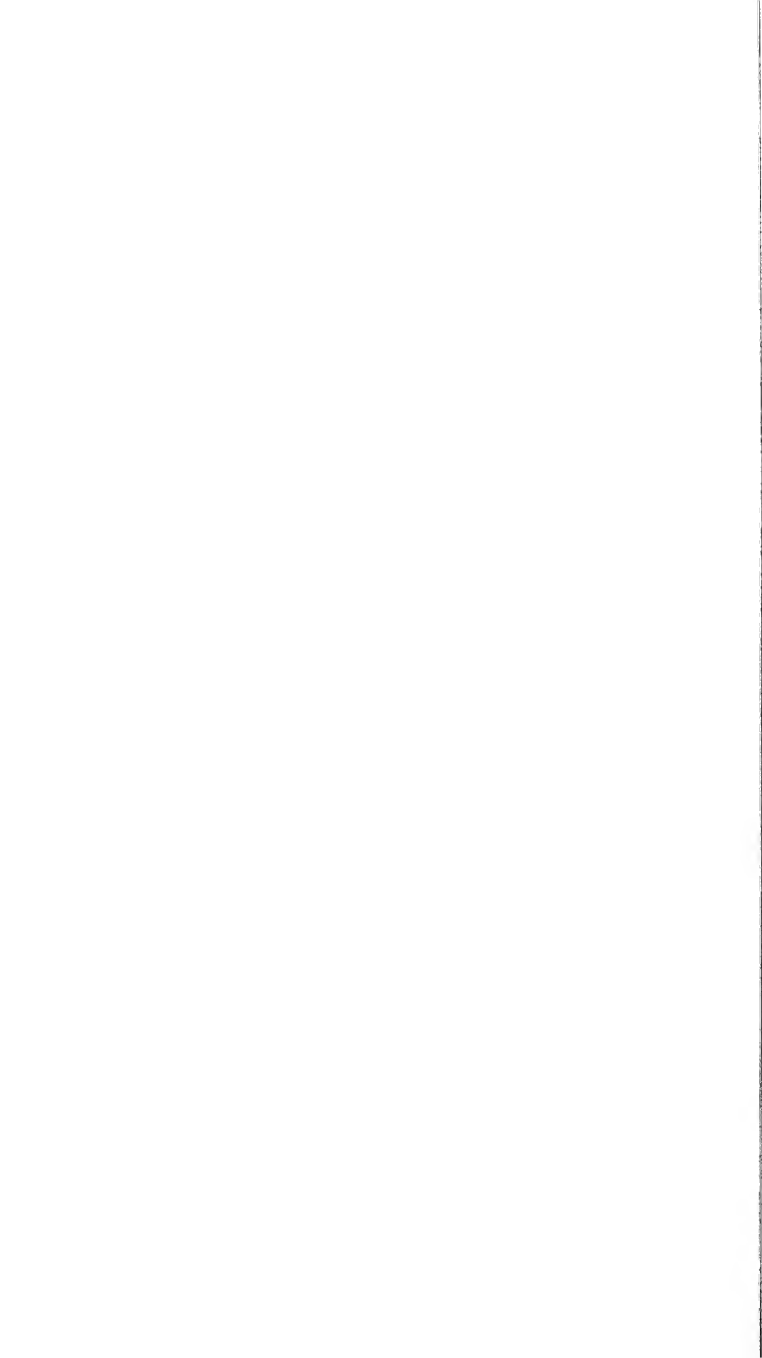
The remedy which will be effective, then, must be one that will convey to the tissues the revivifying and vitalizing agent, phosphorus, in its oxidizable and assimilable form. Thus the true vitality of the nerve structure is restored and with it the healthy function is re-established. The process is not that of stimulation, or whipping up the exhausted powers, but is one of renewing the nutrition of the tissues themselves; hence it is steady and sure in its progress and permanent in its results. The patient feels that he is gradually recovering his accustomed strength of mind and body.
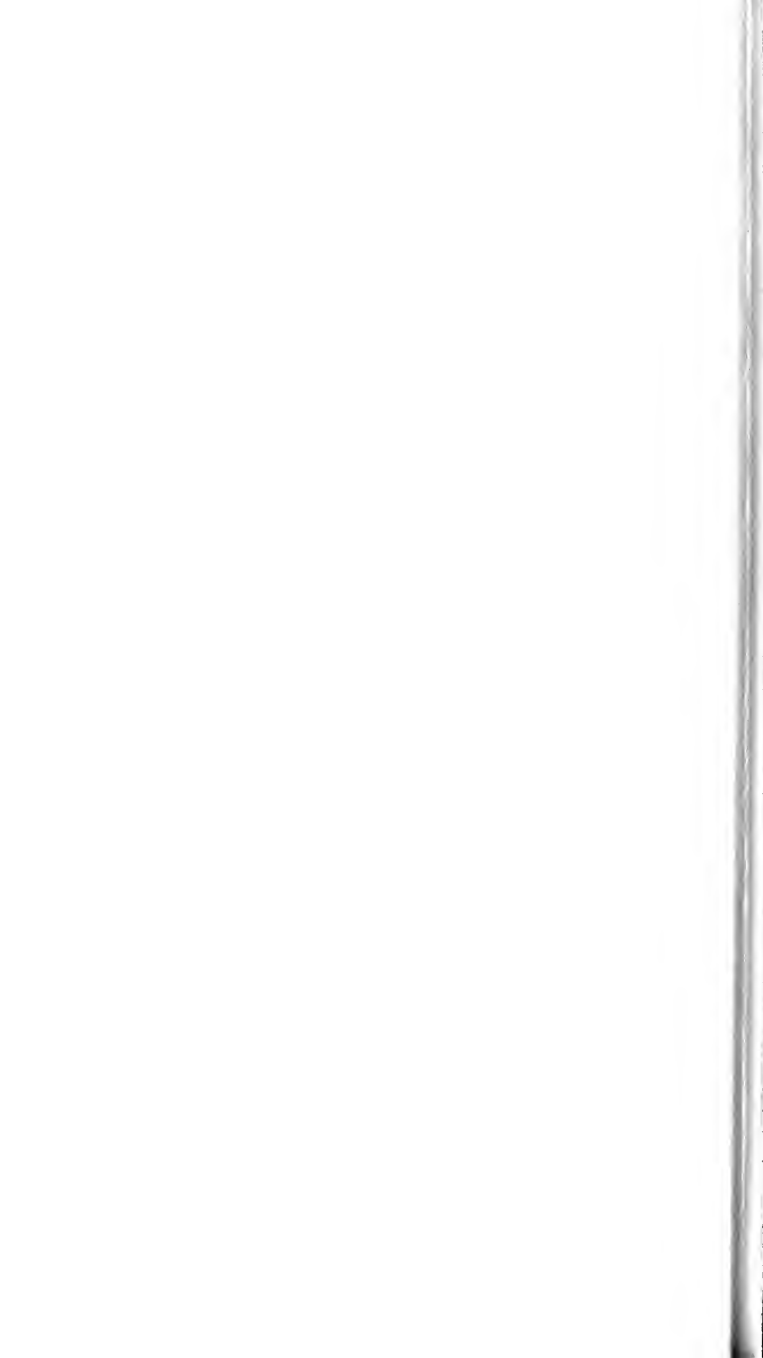
The one form in which the compounds of phosphorus, as they exist in normal animal cells can be conveyed to the tissues and there utilized is in the oxidizable ιᴏ of the hypophosphites of lime and soda, chemically pure. It should be given early, and continued, at appropriate intervals, until the condition has been entirely overcome. Its favorable action in convalescence from acute diseases in general is especially marked in the disease under consideration. By its use many cases of chronic invalidism can be averted, and the susceptibility to intercurrent diseases corrected.

As it is essential to have the agent in an absolutely chemically pure form; McArthur's syrup should be prescribed. This is an agreeable, wholesome syrup, containing only the pure hypophosphites of lime and soda. If you are not already acquainted with it, a full sized bottle will be sent you, if you will agree to pay express cha Address, The McArthur Hypophosphite Company, Boston, Mass.